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WICHITA MOUNTAINS SEISMOLOGICAL OBSERVATORY
FORT SILL, OKLAHOMA, U.S.A.

Operated under the Technical Supervision of the
Air Force Technical Applications Center (AFTAC)

By
The Geotechnical Corporation, Garland, Texas

B. B. Leichliter, Chief Seismologist

REPORT ON THE REGISTRATION OF EARTHQUAKES FOR JANUARY 1961

Volume 1, No. 1

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Seismograms read by Gayle Stanfill and Cecil Morgan

Advanced Research Projects Agency (ARPA)
DEPARTMENT OF DEFENSE,
UNITED STATES GOVERNMENT

THE REGISTRATION OF EARTHQUAKES

AT THE

WICHITA MOUNTAINS SEISMOLOGICAL OBSERVATORY

STATION

STATION ABBREVIATION: WMSO
STATION IDENTIFICATION ON FILM SEISMOGRAMS: a
GEOGRAPHICAL LOCATION *: 34° 43' 05.3" N. Lat.
(Vault No. 6) 98° 35' 20.7" W. Long.

GEOCENTRIC LOCATION *: 34° 32' 09.8" N. Lat.
(Vault No. 6) 98° 35' 20.7" W. Long.

ALTITUDE (METERS) *: 505 Meters (1658 feet)
(Vault No. 6)

GEOLOGY: The station is located on the Carlton (porphyritic) granophyre of the Wichita Mountains of Oklahoma.

NOISE LEVEL - January 1961: The periods of the predominant microseisms at WMSO are 0.5 second and 6 seconds. An amplitude distribution curve for the 0.5 second microseisms may be found on page 2.

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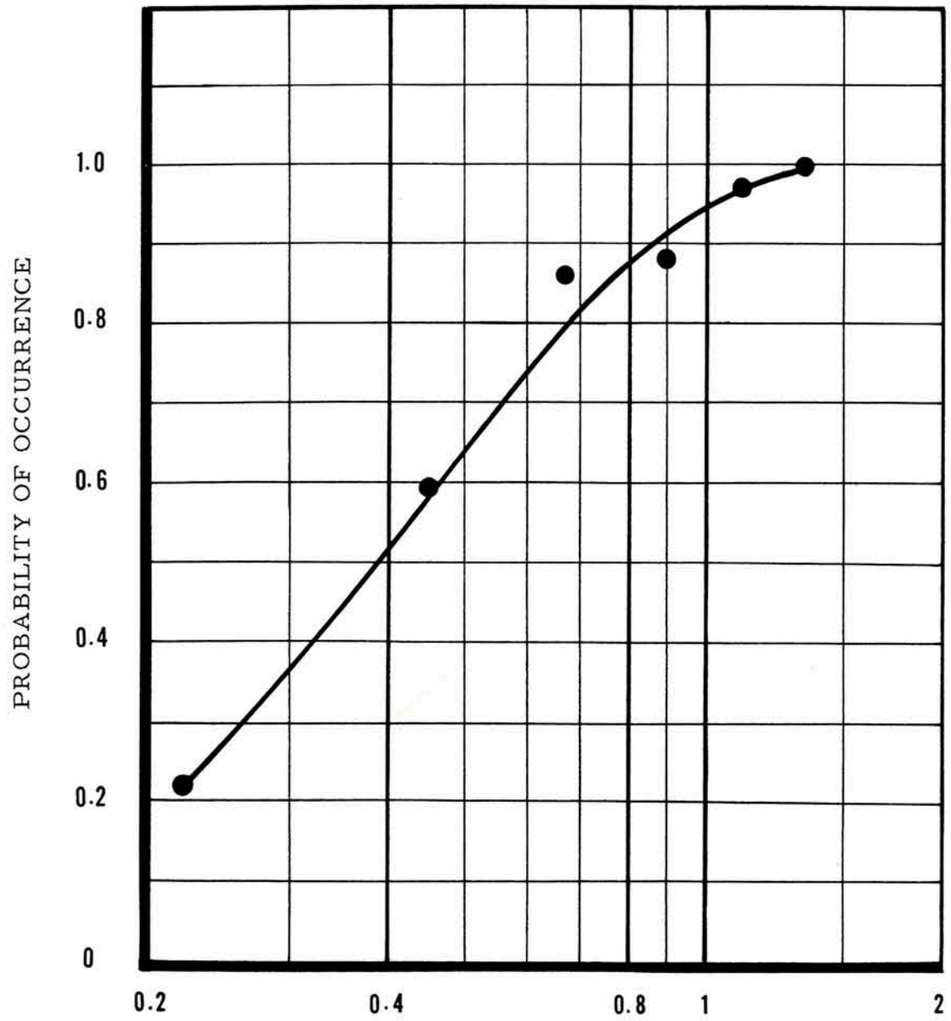
* The coordinates refer to the location of vault No. 6 which houses the 3-component groups of short-period and intermediate band seismometers from which arrival times are determined.



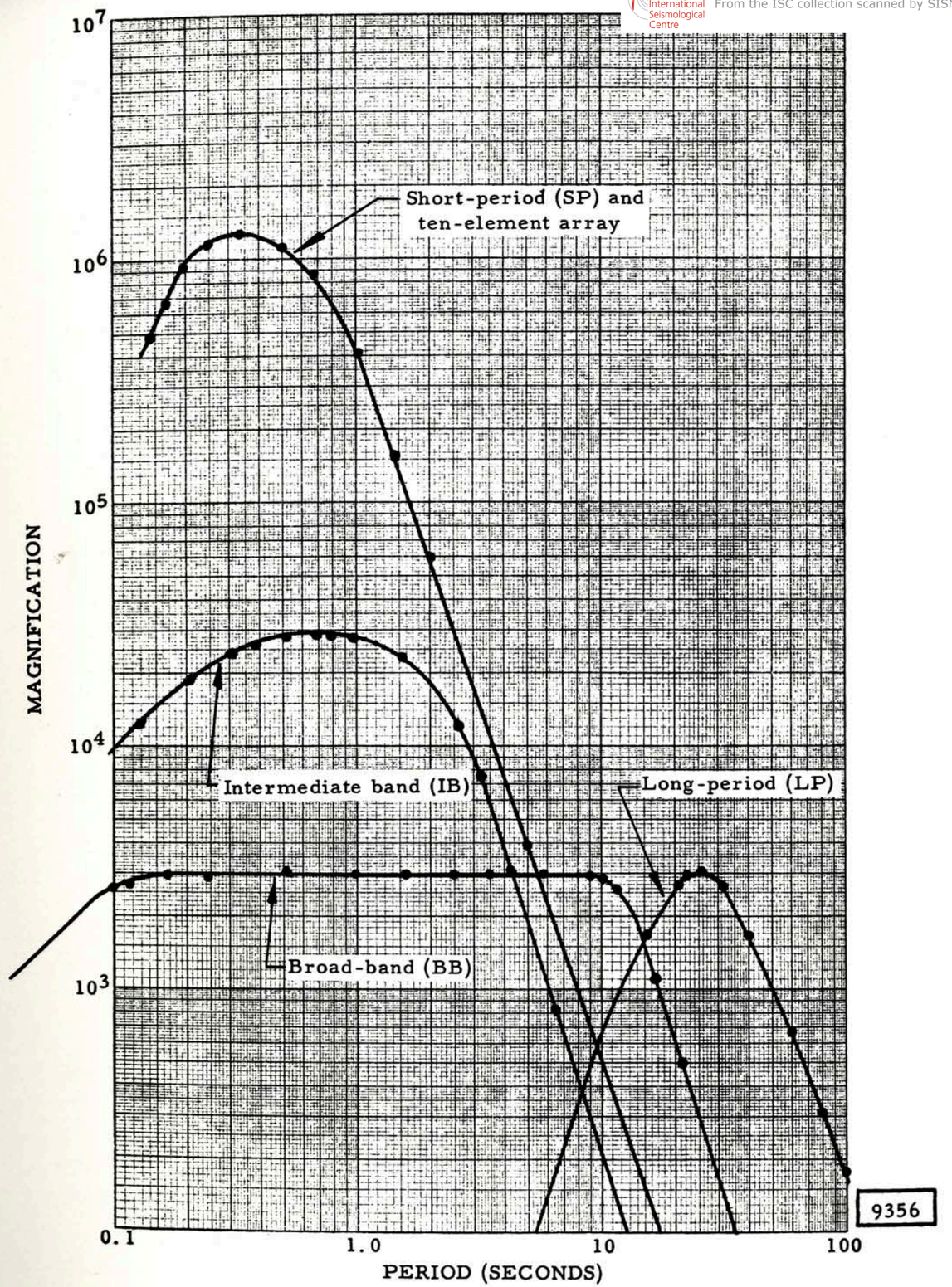
Probability of predominant 0.5-sec microseisms occurring at or less than a given amplitude at unity magnification

SEISMOGRAPHS

	Ts	λ s	Tg	λ g	σ^2
SP Vertical Benioff	1.0	1.0	0.2	1.0	0.01
SP Horizontal Benioff	1.0	1.0	0.2	1.0	0.01
IB Vertical Melton	2.5	0.65	0.64	1.5	0.002
IB Horizontal Sprengnether	2.5	0.65	0.64	1.5	0.0005
BB Vertical Press-Ewing	12.5	0.4	0.64	9.0	0.0002
BB Horizontal Sprengnether	12.5	0.4	0.64	9.0	0.0004
LP Vertical Sprengnether	25.0	1.0	30	1.0	0.004
LP Horizontal Sprengnether	25.0	1.0	30	1.0	0.004

SP = Short Period
IB = Intermediate Band
BB = Broad Band
LP = Long Period
Ts = Free Period of seismometer in secs.
λs = Damping constant of seismometer
Tg = Free Period of Galvanometer in secs.
λg = Damping constant of Galvanometer
σ^2 = Coupling Coefficient

NOTE: Response curves may be found on page 4.



Response characteristics of seismographs

INTERPRETATION OF SYMBOLS

1. Earthquakes Listed

All local (L), near-regional (NR), regional (R), and distant earthquakes (T) are tabulated on the following pages.

2. System

In the column headed "Syst." (system), the seismograph (SP, IB, BB, or LP) and component (Z, N, or E) used to measure arrival time are designated. When no component designation appears, the phase is read from the vertical component. When neither system nor component designation appears, the phase is read from the SP vertical component.

3. Phase

(1) "i" (impetus) preceding a phase designates sudden beginning of the motion. (A designation of "i" in the case of initial P motion indicates a signal-to-noise ratio exceeding about 5/1).
(2) "e" (emersio) designates gradual beginning.
(3) "i" or "e" alone designates an unidentified phase.
(4) ( ) (parenthesis marks) indicate uncertainty.

4. Time

(1) Date and arrival time are given in Greenwich Civil Time (G. C. T.).
(2) The arrival time is reported as the earliest time on Z, N, or E. Single Z rather than the array summation ($\sum$) is used for measuring arrival times on the SP seismographs.

5. Ground Motion

(1) In the columns headed "A" and "T" are tabulated earth displacement in millimicrons and period in seconds, respectively. An amplitude of 999 indicates that a signal cannot be measured reliably. A "c" or "d" in the "A" column indicates compression or dilation, respectively, of the ground as indicated by the vertical component instrument.

The value of "A" for P phases is the maximum amplitude in the first ten seconds. All amplitudes are center-to-peak amplitudes.

(2) Trace amplitudes are measured to the nearest 1/2 millimeter at X10 view.

6. Direction

In the column headed "Dir." (direction), the direction of the epicenter as viewed from WMSO is indicated. For teleseisms, direction is obtained only from P and Rayleigh waves and is listed opposite the phase from which it is obtained. For close events, direction may be obtained from P-wave step-out shown on the individual short-period vertical traces.

7. Type

Earthquakes are identified as either:

L	(local) - - - - - - - - - -	0^{o} - 1.4^{o}
NR	(near-regional) - - - - -	1.4^{o} - 6^{o}
R	(regional) - - - - - - - -	6^{o} - 16^{o}
T	(teleseismic) - - - - - -	16^{o} - 180^{o}

8. Remarks Column

(1) Epicentral locations, time of origins, depth of focii, and magnitudes are obtained from the U.S. Coast and Geodetic Survey Preliminary Determination of Epicenters cards.

(2) The nature of the surface waves is indicated subjectively.

(3) Epicentral locations and distances reported by the station are accompanied by an indication of the phases used to determine epicentral distance, e.g. Δ (S-P) = 6^{o}, Central Colorado.

(4) Operational notes refer to operational difficulties that affect analysis of data.

DATE	Syst.	Phase	Arrival Time G.C.T.	Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h. m. s.					
01 Jan		eP	04 29 58.5	3	1.4		T	
01 Jan		eP	06 21 50.4	1	0.7		T	
01 Jan		eP	06 52 17.0	6	1.1			
		e(PcP)	24.0		0.9			
		e(PP)	56 08.5		1.4	NW	T	
01 Jan		eP	07 49 40.3	5	1.0		T	
01 Jan		eP	10 02 15.5	6	1.1		T	
01 Jan		eP	10 24 25.0	2	0.6		T	
01 Jan		eP	11 06 32.8	4	0.8		T	
01 Jan		eP	13 10 26.7	2	0.5		T	
01 Jan		eP	13 39 26.4	2	0.9		T	
01 Jan		eP	15 27 11.0	2	0.7		T	
01 Jan		eP	16 41 06.2	4	0.8		T	
01 Jan	✓	eP	16 50 34.0	9	0.9		T	18.3 S 178.2 W, h about 663 km
								0 = 16 38 27.8 Fiji Island Region
01 Jan		eP	17 54 23.6	5	1.0		T	
01 Jan		eP	18 55 52.6	3	0.8		T	87.2 N 51.5 E, h about 25 km
								0 = 18 45 49.5 Arctic Ocean
01 Jan		eP'	19 52 15.8	2	0.6		T	54.1 S 7.4 E, h about 91 km
								0 = 19 33 20.1 Bouvet Island Region
01 Jan		eP'	20 41 48.0	9	0.8			49.5 S 125.5 E, h about 59 km
		e	42 06.0		1.4		T	0 = 20 22 14.6 South of Australia
01 Jan		eP	22 42 48.6	1	0.6			
		eS	43 18.0		0.5		NR	Δ (S-P) = 2.5°
02 Jan		eP	02 11 44.2	13	0.8			
		e	15 000		1.3		T	
02 Jan		eP	03 28 29.9	4	0.8			41.4 S 88.8 W, h about 25 km
		e	30 11.5		0.9		T	0 = 03 16 41.0 Off coast of Chile
02 Jan		eP	09 26 40.3	3	0.7		T	

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
02 Jan		eP	10	25	31.1	8	1.0			12.4 S 166.4 E, h about 161 km
		epP		26	01.4		1.3			0 = 10 11 56.9 Santa Cruz
		ePP		29	47.7		2.5			Islands Region.
		e		31	59.9		4.6			Mag. = 6-3/4 (Pas) 6-1/2 - 6-3/4
	LPN	eSKS		35	45		35.0			(Berk). BBZ inop.
	SP	eSKKS		36	25.0		1.8			Strong surface waves on LP
	BBN	eS			41		9.0			and BB
		e		37	35.9		3.2			
	LP	ePPS		39	15		20.0			
		ePKKP		41	44.9		1.0			
		ePKKP		42	08.5		1.5			
	LPN	eSS		44	17		25.0			
	LP	e(SKKS)		48	00		30.0			
	LP	eSur		58	27				T	
02 Jan		eP	12	50	28.2	2	0.6			
		e		51	10.7		0.9			
		e		54	30.6		0.8		T	
02 Jan		eP	16	21	15.2	5	0.2	NNW		
		eS			23.7		0.5		L	Δ (S-P) = .6°
02 Jan		iP	16	32	47.7	c 9	0.7			52.0 N 157.9 E, h about 43 km
		ePcP		33	02.6		0.7		T	0 = 16 21 34.0 Near east coast of Kamchatka
02 Jan		eP	23	30	47.2	2	0.5			
	N	eS		31	08.4		0.6		NR	Δ (S-P) = 1.5°
03 Jan		eP	00	45	55.6	3	1.0		T	
03 Jan		eP	02	42	19.0	1	0.7			46.7 N 152.5 E, h about 42 km
		ePcP			33.9		0.8		T	0 = 02 30 28.8 Kurile Islands
03 Jan		eP	02	49	06.2	1	0.6		T	
03 Jan		eP	05	39	13.4	29	1.4			44.7 S 76.6 W, h about 25 km
	IBE	eS		49	29		5.0		T	0 = 05 26 54.8 Off coast of southern Chile
03 Jan		eP	07	51	43.6	2	0.5		T	
03 Jan		eP	08	22	09.3	5	1.0		T	1.1 N 29.2 W, h about 25 km
										0 = 08 10 40.4 Mid-Atlantic Ocean
03 Jan		eP'	11	59	44.4	22	1.2			6.8 S 120.3 E, h about 72 km
		e	12	00	21.5		1.8			0 = 11 40 42.5 Banda Sea
		ePP		01	45.7		1.2		T	
03 Jan		eP	12	02	54.4	11	0.9			
		e		04	28.5		1.7			
	LP	eSur		15	00				T	Weak surface waves on LP

DATE	Syst.	Phase	Arrival Time G.C.T.	Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h. m. s.					
03 Jan		eP	13 37 44.2	1	0.6			
		e	43 01.3		1.0		T	
03 Jan		eP	15 00 38.4	1	0.5		T	
03 Jan		eP	15 01 29.4	2	0.6		T	
03 Jan		eP	17 52 00.0	8	1.0			20.3 S 68.2 W, h about 211 km
		ePcP	26.2		0.9			0 = 17 41 58.7 Southern Bolivia
		epP	39.9		0.8		T	
03 Jan		eP	18 01 43.7	1	0.2			
	E	eS	02 04.5		0.3		NR	Δ(S-P) = 1.4°
03 Jan		eP	18 10 30.5	2	0.2			
	E	eS	51.1	999			NR	Δ(S-P) = 1.4°
03 Jan		eP	18 13 50.0	1	0.5		T	
03 Jan		ePP	18 21 44.5	1	0.6		T	6.2 S 150.9 E, h about 113 km
								0 = 18 02 53.6 New Britain Region
03 Jan		eP	19 18 33.3	2	0.6			24.0 S 67.0 W, h about 207 km
		epP	19 21.8		0.6			0 = 19 08 08.9 Northern Chile-Argentina border region
		e	59.0		0.8		T	
03 Jan	✓	eP'	19 45 57.7	10	1.2			6.4 S 130.4 E, h about 100 km
	✓	e	46 43.2		1.2			0 = 19 27 00.4 Banda Sea
		e	49 05.9		1.0			
		eSKKP	59 14.3		1.0		T	
03 Jan	✓	eP'	20 24 44.9	10	1.2		T	7.3 S 123.0 E, h about 154 km
								0 = 20 05 33.8 Banda Sea
03 Jan		eP	20 38 29.3	1	0.4			
	E	eS	39 22.2		0.5		NR	Δ(S-P) = 4.3°
03 Jan		eP	22 10 07.9	12	1.4		T	
03 Jan		eP	23 05 29.4	1	0.4			
	N	eS	48.0		0.5		L	Δ(S-P) = 1.3°
03 Jan		eP	23 19 50.4	5	0.6	NW	T	
03 Jan		eP	23 25 12.7	3	0.2	NW		
	E	eS	21.4		0.3		L	Δ(S-P) = .7°
04 Jan		eP	02 00 33.6	1	0.7		T	
04 Jan		eP	03 42 50.6	4	0.8		T	
04 Jan		eP	05 28 30.8	1	0.6		T	
04 Jan		eP	07 30 55.2	1	0.7		T	
04 Jan		eP	11 42 18.0	4	1.0		T	

DATE	Syst.	Phase	Arrival Time G.C.T.			Ground Motion A	Ground Motion T	Dir.	Type	Remarks
961			h.	m.	s.					
4 Jan		eP	12	08	32.6	22	1.2			17.6 N 101.2 W, h about 40 km
	N	eS		11	47.3		1.8			0 = 12 04 33.8 Near coast of
	E	eSur		13	49.3		2.5		R	Guerrero, Mexico
										Strong surface waves on SP
										(BB and LP inop.)
4 Jan		eP	12	32	29.4	2	0.7		T	
4 Jan	✓	eP	13	37	47.8	4	0.8		T	17.4 S 178.9 W, h about 591 km
										0 = 13 25 35.6 Fiji Islands
4 Jan		eP	13	50	46.8	1	0.6		T	
4 Jan		eP	16	15	36.0	2	0.6		T	
4 Jan		eP	18	25	24.0	2	0.6		T	
4 Jan		eP	18	57	12.4	3	0.9		T	
4 Jan		eP	19	16	24.5	2	0.8		T	
4 Jan		eP	19	28	37.4	2	0.5		T	
4 Jan	✓	eP'	19	35	12.0	3	1.0			5.5 S 128.7 E, h about 173 km
		e		36	20.8		1.6		T	0 = 19 16 19.5 Banda Sea
4 Jan		eP	19	37	03.0	4	1.0			
		e		38	03.0		1.0		T	
4 Jan		eP	20	30	02.4	1	0.6			
	E	eS		31	06.0		0.6		NR	Δ(S-P) = 5°
4 Jan		eP	22	33	31.0	2	0.4			
	E	eS		34	12.4		0.5		NR	Δ(S-P) = 3.2°
4 Jan		eP	22	45	40.0	1	0.2			
	E	eS		46	01.3		0.2		NR	Δ(S-P) = 1.4°
4 Jan		eP	22	54	32.7	1	0.2			
	E	eS			55.0		0.3		NR	Δ(S-P) = 1.4°
4 Jan		eP	23	59	55.4	2	0.4			
	E	eS	00	00	26.0		0.6		NR	Δ(S-P) = 2.2°
5 Jan		eP	01	05	35.0	4	1.0		T	
5 Jan		eP	03	47	24.2	3	0.9		T	
5 Jan		eP	11	10	20.4	18	1.5			
		e			35.8		1.4		T	
5 Jan		iP	14	16	08.3	c 999				
	LPE	iS		23	55.4	999				
	BBE	iS			55.4	999				
	LPE	iScS		25	54.0		21.0			
	LPE	iSS		28	00	999				
	LP	Sur		34	45					
		e		37	12.3		1.0			
		e(SKKS)		45	17.7		5.5			

DATE	Syst.	Phase	Arrival Time G.C.T.	Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h. m. s.					
05 Jan	BB	e	14 45 57		16.0			51.6 N 176.3 W, h about 37 km
		eP'P'	46 11.9		1.2		T	0 = 14 06 25.9 Andreanof Island, Aleutian Islands
								Mag. = 6-3/4. Strong surface waves on all systems
05 Jan		eP	15 19 03.4	3	0.8		T	
05 Jan		eP	15 21 44.1	10	1.0			45.7 N 149.3 E, h about 19 km
		ePcP	51.7		0.8			0 = 15 09 37.9 Kurile Islands
		ePP	22 09.0		1.2			
	IB	e	30 19.1		5.0		T	
05 Jan		eP'	16 12 29.8	18	1.5			4.1 S 143.0 E, h about 108 km
		e	13 08.8		0.7			0 = 15 53 56.0 New Guinea
		ePP	38.0		1.0			Mag. = 6-3/4 - 7
		e	14 27.0		2.0			Strong surface waves on LP
		e	17 22.9		3.0			
		ePKKP	23 10.2		0.8			
	LPE	ePS	18.0		30.0			
		e	55.8		1.2			
		e	26 01.0		1.0			
	LPE	eSKKS	29 44		23.0			
	LPE	ePKPPKS	34 22		40.0			
	LPN	ePKPSKS	36 45		30.0			
	LPE	eSur	48 23				T	
05 Jan		eP	18 11 50.4	4	0.8			21.2 S 169.3 E, h about 123 km
		ePP	16 03.2		1.4			0 = 17 57 56.6 Loyalty Island
	LPN	ePP	10		20.0			Region. Mag. = 6-3/4 - 7
		e	17 45.0		1.8			Strong surface waves on all
	N	eSKS	22 28.0		2.0			systems
	E	eSKKS	55.0		4.5			
	LPE	ePS	25 12		22.0			
	LPE	ePPS	26 19		25.0			
		ePKKP	27 47.2		1.0			
		ePKKP	55.1		1.0			
	LPE	eSS	30 05		29.0			
	LPE	ePKKS	31 15		30.0			
	LPE	eSKKS	34 45		30.0			
	LP	eSur	41 30				T	

DATE	Syst.	Phase	Arrival Time G.C.T. h. m. s.	Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961								
05 Jan		eP	18 28 35.5	6	1.0			21.0 S 169.1 E, h about 124 km
		e	01.1		1.4			0 = 18 14 43.0 Loyalty Islands
		ePP	47.2		1.2			Mag. = 6-3/4
	LP	eSKS	39 14		25.0			Strong surface waves on LP and
	E	eSKKS	40.0		3.5			BB
	LPN	e	41 00		30.0			
		ePKKP	44 30.8		1.1		T	
05 Jan		eP	18 47 34.0	15	1.3			51.3 N 176.6 W, h about 30 km
		epP	50.6		1.6			0 = 18 37 48.3 Andreanof
		e	48 50.5		1.5		T	Island, Aleutian Islands
05 Jan		eP	18 53 39.0	17	1.0			
		epP	54.0		0.9			8.2 N 83.1 W, h about 82 km
		e	59 16.6		1.0		T	0 = 18 47 33.5 Costa Rica
								Panama Border Region
05 Jan		eP	20 13 44.1	1	1.0		T	
05 Jan		eP	20 36 38.2	1	0.3			
	N	eS	37 31.9		0.6		NR	Δ(S-P) = 4.2°
05 Jan		eP	23 50 14.8	3	0.6		T	
06 Jan		eP	00 08 28.5	6	1.0			
		e	32.6		0.8			
		e	44.8		1.0		T	
06 Jan		eP	01 33 04.6	8	1.0			42.5 N 143.4 E, h about 21 km
		epP	18.2		1.4		T	0 = 01 20 30.8 Hokkaido, Japan
06 Jan		eP	01 52 59.6	4	0.7			
		e	53 33.7		0.8		T	
06 Jan		eP	06 31 18.0	22	1.1			51.8 N 176.2 W, h about 48 km
		epP	33.0		1.4			0 = 06 21 38.6 Andreanof
		ePcP	32 13.4		0.6		T	Island, Aleutian Islands
06 Jan		eP	07 16 55.8	8	0.6			53.3 N 159.7 E, h about 24 km
		eScS	26 42.6		1.6		T	0 = 07 05 47.7 Kamchatka
06 Jan		eP	08 50 03.2	6	1.0		T	
06 Jan		eP	10 15 38.4	2	0.7		T	
06 Jan		eP	10 52 56.5	16	0.8			14.2 N 95.8 W, h about 45 km
		e	53 06.0	999				0 = 10 48 22.9 Off south coast
		e	14.6	999				of Mexico
	E	eSur	56 25.6		1.0		R	
06 Jan		eP	11 32 43.8	3	1.0		T	
06 Jan		eP	11 35 57.8	5	0.8		T	

DATE	Syst.	Phase	Arrival Time G.C.T.	Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h. m. s.					
06 Jan		eP	13 35 51.4	3	0.9		T	
06 Jan		eP	15 17 53.8	6	1.0			
		e	56.6		1.0		T	
06 Jan		eP	16 57 03.3	1	0.6		T	
06 Jan		eP	19 06 54.6	2	0.8		T	
06 Jan		eP	19 32 51.0	3	0.6			
	E	eS	33 36.2		0.6		NR	Δ(S-P) = 3.5°
06 Jan		eP	23 21 31.6	3	0.7			56.7N 162.7 E, h about 286 km
		e	25 11.6		0.6		T	0 = 23 11 11.2 Kamchatka
07 Jan		eP	00 54 33.4	3	0.2			
	E	eS	58.5	999			NR	Δ(S-P) = 2°
07 Jan		eP	03 38 28.4	2	0.8		T	
		eP	09 26 39.4	2	0.6			
		e	27 07.0		0.6		T	
07 Jan		eP	10 44 01.5	9	0.8			35.9 N 27.0 E, h about 127 km
		e	45 35.7		0.7		T	0 = 10 30 58.0 Dodecanese Island
07 Jan		eP	11 08 11.6	2	0.6		T	
07 Jan		eP	16 05 48.1	3	0.8			37.7 N 21.1 E, h about 22 km
		epP	58.2		1.4			0 = 15 52 54.0 Near west coast
		e	06 43.5		0.8		T	of Greece
07 Jan		eP	18 09 13.4	3	0.2			
	E	eS	22.2		0.2		L	Δ(S-P) = .7°
07 Jan		eP	18 31 45.4	2	0.7			
		e	32 21.8		0.9		T	
07 Jan		eP'	18 35 23.2	2	0.5			57.2 S 25.3 W, h about 94 km
		ePP	36 07.8		0.9			0 = 18 16 51.2 Sandwich Islands
		e	42.8		1.1		T	
07 Jan		eP	18 46 36.4	4	0.7			
		e	52.7		0.7		T	
07 Jan		eP	23 58 07.8	6	0.9		T	
08 Jan		eP	01 26 18.8	2	0.6		T	
08 Jan		ePP	01 35 41.4		0.7		T	4.1 N 129.3 E, h about 106 km
								0 = 01 15 25.6 Halmahera Region

DATE	Syst.	Phase	Arrival Time G.C.T.	Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h. m. s.					
08 Jan		ePP	03 16 45.8		1.0		T	3.5 N 129.6 E, h about 117 km
								0 = 02 56 34.1 Halmahera
								Region
08 Jan		eP	03 31 31.4	5	0.6			
		e	36.0		0.7		T	
08 Jan		eP	04 16 48.1	2	0.9			
		e	17 05.6		1.0		T	
08 Jan		eP	05 31 13.2	16	1.0			15.8 S 73.1 W, h about 135 km
		ePcP	32 12.6		0.6			0 = 05 21 46.7 Southern Peru
08 Jan		eP	09 52 25.4	1	0.4			44.8 N 110.3 W, h about 27 km
	E	eSur	56 53.8		0.6		R	0 = 09 49 06.9 Yellowstone
								National Park, Wyoming
08 Jan		eP	10 13 48.8	1	0.5		T	25.9 S 179.6 E, h about 538 km
								0 = 10 01 06.6 Kermadec
								Island Region
08 Jan		eP	17 26 28.0	1	0.4			
	E	eSur	28 13.6		0.6		R	
08 Jan		eP	17 47 41.5	2	0.5			
	E	eSur	49 23.0		0.6		R	
08 Jan		eP	23 51 18.0	2	0.8		T	
08 Jan		eP	23 57 54.6	31	1.0			
09 Jan	E	eSur	00 01 42.6		0.8	SE	R	
09 Jan		eP	00 04 44.9	7	0.8			
	E	eSur	08 43.9		0.6		R	
09 Jan		eP	03 17 14.3	19	1.2			31.2 N 41.0 W, h about 49 km
		ePcP	18 52.3		1.6			0 = 03 08 37.7 North Atlantic
		ePP	03 19 25.5		1.5		T	Ocean
09 Jan		eP	04 41 10.4	9	1.4		T	
09 Jan		eP	07 21 06.0	4	0.2			
		eS	10.9		0.3		L	Δ(S-P) = .4°
09 Jan		eP	11 14 10.4	2	0.5			
		ePP	15 53.2		1.0			17.7 N 61.1 W, h about 25 km
		ePcP	16 28.7		1.0		T	0 = 11 06 56.9 Leeward Islands
09 Jan		eP	11 18 21.3	2	0.6			17.6 N 61.0 W, h about 52 km
		ePP	20 02.9		0.9			0 = 11 11 12.5 Leeward Islands
		ePcP	38.8		1.1		T	
09 Jan		eP	11 31 19.4	1	0.4		T	
09 Jan		eP	17 27 22.6	1	0.7		T	

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
09 Jan		eP	19	29	19.4	3	0.5			17.8 N 61.0 W, h about 31 km
		e		30	16.0		0.7		T	0 = 19 22 05.6 Leeward Islands
09 Jan		eP	19	32	09.1	3	0.5			17.7 N 61.6 W, h about 31 km
		ePcP		34	26.7		0.9		T	0 = 19 24 59.5 Leeward Islands
09 Jan		eP	20	46	22.2	1	0.3			
	E	eSur		47	37.0		0.3		R	
09 Jan		eP	21	22	37.2	11	0.8			
		e		23	29.2		0.8		T	
09 Jan		eP	22	15	22.2	3	0.4			
	E	eS			44.2		0.4		NR	Δ(S-P) = 1.5°
09 Jan		eP	22	48	35.8	1	0.3			
		eS			57.3		0.4		NR	Δ(S-P) = 1.5°
09 Jan		eP	23	08	09.2	1	0.4			
	E	eSur		09	43.4		0.6		R	
10 Jan		eP	05	33	08.8	3	0.6		T	
10 Jan		eP	09	35	33.3	4	1.0		T	
10 Jan		eP	11	05	30.8	3	0.8			
		e		06	40.2		1.0		T	
10 Jan		eP	11	16	29.0	2	0.5		T	
10 Jan		eP	11	39	18.3	2	0.6		T	
10 Jan		iP	14	33	47.7	c75	0.8			49.9 N 156.2 E, h about 29 km
		ePP		36	30.0		1.1			0 = 14 22 18.2 Kurile Island
	BBN	ePP			55		5.0			Region. Mag. = 6-3/4
	BBN	ePPP		38	35		10.0			Strong surface waves on LP and
		e		41	20.8		1.4			BB
	BBN	eS		43	12		9.0			
	LPN	eS			16		27.0			
	N	eSKS			38.2		2.5			
		e		46	26.2		1.0			
	LPN	eSS		48	00.0		22.0			
	LPN	e(SSS)		50	42.0		25.0			
	LP	e		52	05.0		23.0			
	LP	eSur		54	55.0					
	LP	eSur		59	00.0					
		eP'P'		01	20.2		1.4		T	
10 Jan		eP	15	14	12.5	1	0.6		T	
10 Jan		eP	16	31	40.3	1	0.6			
	E	eSur		34	36.6		0.8		R	

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
10 Jan		eP	17	02	38.9	2	0.3	NNW		
	E	eS			54.7		0.3		L	Δ(S-P) = 1.1°
10 Jan		eP	21	16	55.0	1	0.4			
		eS		17	13.0		0.4		L	Δ(S-P) = 1.2°
10 Jan		eP	22	08	26.9	1	0.4			
		eS			44.6		0.6		L	Δ(S-P) = 1.1°
11 Jan		eP	04	32	33.1	1	0.7		T	
11 Jan		eP	12	07	35.3	1	0.6			52.3 N 170.7 W, h about 42 km
		epP			46.3		0.7			0 = 11 58 23.8 Fox Islands,
		ePcP		08	55.3		0.8		T	Aleutian Islands
11 Jan		eP	12	09	11.2	12	0.8			51.8 N 171.0 W, h about 47 km
		ePcP		10	40.2		1.0			0 = 11 59 55.0 Fox Islands,
		ePP		11	24.9		1.4			Aleutian Islands
		eScP		14	13.9		0.9			Strong surface waves on BB and
	BBE	eS		16	42.5		8.0			LP
	LP	eSur		24	25.0					
	BB	eSur		38	46.0					
		eP'P'		39	25.2		1.0		T	
11 Jan		eP	13	41	54.2	3	1.0		T	
11 Jan		eP'	16	50	56.6		0.6		T	54.7 S 162.9 E, h about 27 km
										0 = 16 31 50.6 Macquarie
										Island
11 Jan		eP	19	33	53.6	4	1.0		T	
11 Jan		eP	19	39	38.9	4	0.5			24.7 S 69.8 W, h about 98 km
		e		40	56.8		0.8			0 = 19 29 05.9 Near coast of
		ePP		42	07.9		1.2		T	northern Chile
11 Jan		eP	20	09	48.3	4	1.0		T	
11 Jan		eP	22	40	33.1	1	0.3			
		eS			54.8		0.4		NR	Δ(S-P) = 1.5°
12 Jan		eP	01	02	30.0	2	0.6		T	
12 Jan		eP	01	29	10.4	1	0.6		T	
12 Jan		eP	14	21	33.8	18	1.0			57.4 N 155.9 W, h about 40 km
		e			54.2		0.7			0 = 14 13 27.7 Alaska
		eScP		27	21.8		1.0		T	Peninsula
12 Jan		eP	16	28	16.0	1	0.6			
		e		29	06.2		0.8		T	

DATE	Syst.	Phase	Arrival Time G.C.T.			Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h.	m.	s.					
12 Jan		eP	19	07	29.1	3	0.8			
		e		09	14.2		0.8		T	
12 Jan		eP	19	19	42.6	4	0.7		T	
12 Jan		iP	19	38	56.8	c 999		NE		
		iS		39	00.2	999			L	Δ(S-P) = .3°
12 Jan		eP	19	44	43.7	7	0.7	SE		
		e			47.0	999				
		e			56.4	999				
		e	20	03	46.4	1			T	
12 Jan		eP	22	04	41.8	1	0.6		T	
13 Jan		eP	10	37	02.3	6	0.6		T	
13 Jan		eP	12	16	27.0	2	0.8		T	
13 Jan		eP	18	14	16.0	1	0.5			
		eS			59.0		0.6		NR	Δ(S-P) = 3.5°
13 Jan		eP	18	22	44.9	1	0.6		T	
13 Jan		eP_1'	19	38	11.1	1	0.8			46.5 S 34.1 E, h about 60 km
	✓	e			18.3		0.9			0 = 19 18 44.7 Near Prince
		e(PP)	19	41	20.0		1.0		T	Edward Islands
13 Jan		eP	20	14	44.8	5	0.7			
		e			58.2		1.2		T	
13 Jan		eP	20	29	38.2	1	0.6		T	
14 Jan		eP	01	52	39.0	2	0.7		T	
14 Jan		eP	02	36	46.4	6	0.7			53.4 N 172.4 E, h about 90 km
		e			54.0		0.9			0 = 02 26 30.6 Near Islands,
		e		37	21.8		1.0			Aleutian Islands
		ePcP			27.2		0.8		T	
14 Jan		eP	02	52	17.7	4	0.3			
	E	eSur		54	12.0		0.5		R	
14 Jan		eP	03	05	55.4	2	0.6		T	
14 Jan		eP	03	36	58.6	1	0.6			
	E	eS		37	47.6		0.6		NR	Δ(S-P) = 4°
14 Jan		eP	04	01	20.4	2	0.5			
	N	eS		02	06.0		0.6		NR	Δ(S-P) = 3.7°
14 Jan		eP	04	35	15.0	1	0.6			
		eS			56.2		0.6		NR	Δ(S-P) = 3.2°
14 Jan		eP	04	41	34.6	1	0.4			
	E	eSur		43	06.4		0.5		R	

DATE	Syst.	Phase	Arrival Time G.C.T.	Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h. m. s.					
14 Jan		eP	07 38 40.8	7	0.8			
		e	39 23.7		0.5		T	
14 Jan		iP	09 08 06.7	d 4	0.5		T	
14 Jan		eP	10 02 44.5	2	0.7		T	
14 Jan		iP	16 24 16.3	c 999	0.7			6.7 N 73.0 W, h about 177 km
		e	29 32.4		1.1			0 = 16 17 25.5 Colombia
		e	31 30.2		0.7			Weak surface waves on LP
	LP	eSur	46				T	
14 Jan		eP	16 47 35.4	11	0.9			53.9 N 163.7 W, h about 41 km
		e	47.4		0.9			0 = 16 38 55.6 Unimak Island
	IB	e	16 48 21.0		2.5			Region. Mag. = 5-3/4
		ePcP	51.6		1.0			Strong surface waves on LP
		e	16 49 54.2		1.0			and BB
		e	53 34.2		3.0			
	LPN	eS	16 54 37.		24.0			
	LP	eSur	57 32					
	LP	eSur	17 00 44.0				T	
14 Jan		eP	23 41 58.0	1	0.6		T	
14 Jan		eP	23 56 18.5	1	0.4			
	E	eSur	57 50.4		0.6		R	
15 Jan		eP'	01 22 21.6	3	1.0		T	53.6 S 139.6 E, h about 25 km
								0 = 01 02 50.2 South of Australia
15 Jan		eP	04 07 12.2	2	0.6		T	
15 Jan		eP	04 07 22.1	2	0.4			
	E	eSur	10 29.4		0.5		R	
15 Jan		eP	04 19 08.2	2	0.8		T	30.0 N 140.4 E, h about 285 km
								0 = 04 06 15.8 South of Honshu, Japan
15 Jan		eP	06 03 25.6	1	0.6			17.4 N 61.2 W, h about 60 km
		e	35.5		0.6		T	0 = 05 56 15.1 Leeward Islands
15 Jan		eP	08 30 56.7	3	0.8			30.3 S 70.5 W, h about 25 km
		epP	31 07.8		1.1		T	0 = 08 19 45.0 Near coast of northern Chile
15 Jan		eP	12 05 47.7	15	1.0		T	39.5 N 143.3 E, h about 75 km
								0 = 11 53 10.9 Near east coast of Honshu, Japan
15 Jan		eP	14 22 56.0	1	0.6		T	

DATE	Syst.	Phase	Arrival Time G.C.T.	Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h. m. s.					
15 Jan		eP	16 58 27.5	3	0.8			20.4 S 169.5 E, h about 182 km
		epP	59 00.2		1.0			0 = 16 44 44.8 Loyalty Islands
		ePP	17 02 37.2		1.4			Region
		ePKKP	14 26.0		0.8		T	
15 Jan		eP'	20 52 40.5	12	0.8			5.2 S 110.0 E, h about 565 km
		e	53 18.6		0.8			0 = 20 34 14.3 Java Sea
		eSKP	55 30.4		0.9			
		ePKS	56 20.0		5.0		T	
15 Jan		eP	21 03 57.4	8	0.7		T	
15 Jan		eP	22 19 43.4	2	0.2			
		eS	20 05.4	999	0.4		NR	Δ (S-P) = 1.4°
15 Jan		eP	23 56 53.5	1	0.4		T	
16 Jan		eP	01 53 32.2	8	1.0			13.0 N 99.4 W, h about 25 km
		ePP	53.2		0.9			0 = 01 48 50.2 Off coast of
	E	eSur	58 51.2		3.0			Mexico.
	LP	eSur	59 27				T	Weak surface waves on LP
16 Jan		eP	04 02 36.3	1	0.6			18.2 N 102.4 W, h about 153 km
		e	38.7		0.7			0 = 03 58 52.5 Near coast of
	BB	e	44		1.2			Mexico.
		e	49.9		2.0			Strong surface waves on all
	LP	e	05 53					systems
	LP	eSur	07 32				R	
16 Jan		eP	06 58 34.8	2	0.6		T	
16 Jan		eP	07 33 08.7	124	1.5			36.0 N 141.1 E, h about 131 km
	LP	eP	12		16.0			0 = 07 20 18.6 Near east coast
		e	19.7		1.6			of Honshu, Japan. Mag. = 6-3/4 -
	LP	ePP	36 47		22.0			7. Strong surface waves on all
		e	52.6		1.9			instruments
	LP	eS	43 40		19.0			
	LP	eSur	48 50					
		ePKKP	50 42.8		0.7		T	
16 Jan		eP	09 01 06.7	6	1.0			35.0 N 141.3 E, h about 188 km
		epP	45.0		0.7		T	0 = 08 48 17.7 Near east coast
								of Honshu, Japan
16 Jan		eP	10 01 38.6	2	0.5		T	
16 Jan		eP	11 32 35.5	2	0.6			
		e	49.0		1.2			
		e	34 40.2		1.2			

DATE	Syst.	Phase	Arrival Time G.C.T.	Ground Motion A	Ground Motion T	Dir.	Type	Remarks
16 Jan		e	11 37 37.6		1.5			35.7 N 140.6 E, h about 157 km
	LPE	eS	43 28.0		20.0		T	0 = 11 19 46.5 Near east coast of Honshu, Japan
16 Jan		eP	11 54 00.2	1	0.5			35.2 N 141.0 E, h about 149 km
		e	11.1		0.8		T	0 = 11 41 06.2 Near east coast of Honshu, Japan
16 Jan		eP	12 25 24.5	116	1.8			36.2 N 141.7 E, h about 105 km
		epP	35.7		1.0			0 = 12 12 34.4 Honshu, Japan
		e(PP)	28 20.4		1.4			Mag. = 6-1/2 - 6-3/4
	LPE	eS	35 55.0		17.0			Strong surface waves on LP and
	E	eS	36 19.2		3.0			BB.
	LPE	e	41 05.0		27.0			
		ePKKP	42 56.2		0.6			
	LP	eSur	45 45.0					
		e	50 30.4		0.6			
	LP	eSur	52 00.0				T	
16 Jan		eP	12 49 48.8	2	0.5			
		eSur	53 43.4		0.4		R	
16 Jan		eP	13 22 08.1	2	0.5			35.6 N 140.8 E, h about 144 km
		e(pP)	19.0		0.9		T	0 = 13 09 17.7 Near east coast of Honshu, Japan
16 Jan		eP	14 05 04.7	2	0.6		T	
16 Jan		eP	14 16 53.7	52	1.8		T	36.3 N 141.2 E, h about 127 km
								0 = 14 04 05.3 Near east coast of Honshu, Japan
16 Jan		eP	14 57 14.4	1	0.5		T	36.7 N 141.8 E, h about 108 km
								0 = 14 44 15.1 Honshu, Japan
16 Jan		eP	15 09 47.8	2	0.5		T	
16 Jan		eP	15 39 08.4	1	0.5		T	36.5 N 141.2 E, h about 143 km
								0 = 15 26 21.2 Near east coast of Honshu, Japan
16 Jan		eP	15 54 09.9	69	1.5			36.4 N 140.6 E, h about 147 km
	IB	e	18.5		2.3			0 = 15 41 23.3 Near east coast
		e	56 52.5		1.0			of Honshu, Japan
		e	58 12.4		1.0			Strong surface waves on LP
	LPE	eS	16 04 46.0		20.0			
	E	eS	05 01.7		3.2			
	LPN	eSur	21 18.0				T	
16 Jan		eP	17 29 05.0	2	0.2			
	E	eS	26.2		0.4		NR	Δ(S-P) = 1.5°

DATE	Syst.	Phase	Arrival Time G.C.T.	Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h. m. s.					
16 Jan		eP	18 02 47.2	1	0.3			
	E	eS	03 08.7		0.3		NR	Δ(S-P) = 1.5°
16 Jan		eP	19 45 17.0	3	1.0		T	
16 Jan		eP	19 54 22.3	2	0.5			
	E	eSur	55 38.6		0.5		R	
17 Jan		eP	00 42 26.1	3	1.0		T	36.5 N 141.8 E, h about 100 km
								0 = 00 29 35.7 Near east coast of Honshu, Japan
17 Jan		eP	02 03 48.6	1	0.6		T	
17 Jan		eP	02 48 45.8	1	0.6		T	
17 Jan		eP	04 30 16.6	2	0.8		T	58.8 N 135.9 W, h about 109 km
								0 = 04 23 36.3 Southeastern Alaska
17 Jan		eP	06 54 29.9	9	1.0			36.2 N 141.6 E, h about 99 km
		e	40.4		0.8		T	0 = 06 41 36.8 Honshu, Japan
17 Jan		eP	11 41 56.0	1	0.5			
		e	42 06.8		0.5		T	
17 Jan		eP	14 02 38.4	20	0.8	SE		
		e	03 14.2		0.7		T	
17 Jan		eP	23 19 30.4	3	1.0		T	21.4 S 169.3 E, h about 84 km
								0 = 23 05 32.5 Loyalty Islands Region
17 Jan		eP	23 24 45.0	8	1.0		T	
17 Jan		eP	23 35 14.9	2	0.9		T	
17 Jan		eP	23 35 48.1	999				
		eS	56.4	999			L	Δ(S-P) = .6°
17 Jan		eP	23 45 32.2	6	0.9		T	
18 Jan		eP	01 45 51.9	1	0.5		T	
18 Jan		eP	02 53 23.1	2	0.8		T	
18 Jan		eP	04 33 55.7	6	0.6			31.9 S 64.3 W, h about 57 km
		ePcP	34 13.4		0.6			0 = 04 22 24.3 Cordoba Province, Argentina
		ePP	36 36.3		1.0		T	
18 Jan		eP	05 44 21.7	1	0.6			
		e	27.7		0.9		T	
18 Jan		eP	15 23 05.6	3	0.6			24.4 S 176.3 W, h about 10 km
		e	14.5		0.8		T	0 = 15 09 44.9 Tonga Islands Region

DATE	Syst.	Phase	Arrival Time G.C.T.	Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h. m. s.					
18 Jan		eP	17 59 56.3	999				
		eS	18 00 17.2	999			NR	Δ(S-P) = 1.4°
18 Jan		eP	20 02 57.0	11	0.9			61.7 N 150.4 W, h about 150 km
		epP	03 23.6		0.8		T	0 = 19 55 12.8 Southern Alaska
18 Jan		eP	21 03 52.7	2	0.6		T	
18 Jan		eP	22 56 08.4	1	0.2			
	E	eS	29.6		0.4		NR	Δ(S-P) = 1.5°
19 Jan		eP	00 58 24.6	3	0.6			
		e	33.3		0.6		T	
19 Jan		eP	01 30 57.0	10	0.6		T	
19 Jan		eP	02 29 17.4	4	0.7		T	
19 Jan		eP	11 01 38.6	3	0.6		T	
19 Jan		eP	17 33 48.0	41	1.0			49.7 N 155.8 E, h about 31 km
	E	eS	43 04.6		5.5			0 = 17 22 16.9 Kurile Islands
	LP	eS	13		25.0			Mag.=5-1/4 - 6-1/2
	N	eScS	38.0		2.0			Strong surface waves on LP
	LPN	eSS	48 05.		27.0			
	LP	eSur	52 00					
	LP	eSur	58 00				T	
19 Jan		eP	18 52 32.2	2	0.2			
		eS	36.0	999			L	Δ(S-P) = .4°
19 Jan		eP	21 02 13.8	2	0.6		T	
19 Jan		eP	21 39 39.4	6	0.7		T	
19 Jan		eP	21 46 17.8	1	0.3			
		eS	39.4		0.4		NR	Δ(S-P) = 1.5°
20 Jan		eP	01 04 49.8	3	0.6		T	56.5 N 152.1 W, h about 55 km
								0 = 00 56 59.7 Near Kodiak Island, Alaska
20 Jan		eP	01 09 20.5	5	1.0		T	
20 Jan		eP	01 55 50.6	15	1.0			20.3 N 108.6 W, h about 84 km
	LPE	eS	59 12		21.0			0 = 01 51 56.6 Off coast of
	LPE	eSur	02 00 11		20.0		R	Mexico. Weak surface waves on LP
20 Jan		eP	02 42 02.0	4	1.0			
		e	14.8		1.4		T	
20 Jan		eP	03 14 26.3	1	0.7			
		e	42.8		1.0		T	

DATE	Syst.	Phase	Arrival Time G.C.T.			Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h.	m.	s.					
20 Jan		eP	03	52	45.9	2	0.6		T	
20 Jan		eP	04	24	07.3	2	0.8		T	
20 Jan		eP	05	31	06.1	4	0.8		T	56.4 N 152.0 W, h about 58 km
										0 = 05 23 16.1 Near Kodiak Island, Alaska
20 Jan		eP	08	58	34.6	6	0.7			59.4 N 154.3 W, h about 91 km
		epP		59	02.0		0.8			0 = 08 50 34.0 Southern Alaska
		eScP	09	04	00.6		0.6		T	
20 Jan		eP	11	28	02.2	4	0.7			
		e			33.4		0.6		T	
20 Jan		eP	13	01	38.9	9	0.9		T	
20 Jan		eP	13	41	03.2	2	0.5		T	56.5 N 152.2 W, h about 44 km
										0 = 13 33 12.8 Near Kodiak Island, Alaska
20 Jan		eP	17	12	23.3	5	0.8		T	
20 Jan		eP	17	17	06.6	34	1.0			56.4 N 152.3 W, h about 46 km
		ePcP		19	05.8		1.0			0 = 17 09 15.7 Kodiak Island
	LPN	eS		23	32		17.0			Mag. 6-3/4 (Pas). Strong
	LPN	eScS		26	51		20.0			surface waves on LP and BB
	LP	eSur		29	25	999	25.0		T	
20 Jan		eP	21	38	55.3	2	0.5		T	56.8 N 152.1 W, h about 43 km
										0 = 21 31 08.7 Near Kodiak Island
20 Jan		eP	21	45	22.7	5	1.0			56.5 N 153.1 W, h about 14 km
										0 = 21 37 23.4 Near Kodiak Island, Alaska
20 Jan		eP	21	47	59.1	1	0.2			
		eS		48	07.9	999			L	Δ(S-P) = .6°
20 Jan		eP	22	37	50.5	1	0.2			
	E	eS		38	11.9		0.2		NR	Δ(S-P) = 1.4°
20 Jan		eP	22	47	42.1	6	1.0			38.1 N 141.2 E, h about 52 km
		e		48	14.4		1.0		T	0 = 22 34 51.1 Near east coast of Honshu, Japan
21 Jan		eP	00	53	18.8	3	0.6		T	
21 Jan		eP	05	40	32.6	2	0.7		T	
21 Jan		eP	06	24	10.9	2	0.8		T	
21 Jan		iP	06	50	08.2	c 999		NE		
		eS			23.1	999			L	Δ(S-P) = .7°

DATE	Syst.	Phase	Arrival Time	Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h. m. s.					
21 Jan		eP	07 17 44.5	2	0.6		T	
21 Jan		eP	09 10 16.9	3	0.8		T	
21 Jan		eP	09 50 52.9	3	0.8			
		e	51 03.2		0.6		T	
21 Jan		eP	10 29 35.2	3	0.9		T	
21 Jan		eP	11 19 50.9	2	0.9			
		e	20 09.8		0.5		T	
21 Jan		eP	13 27 16.9	4	0.8		T	56.3 N 152.1 W, h about 63 km
								0 = 13 19 28.2 Near Kodiak
								Island, Alaska
21 Jan		eP	13 53 33.0	1	0.5			
		eSur	57 19.1		1.4		R	
21 Jan		eP	14 32 30.7	2	0.8			
		e	32 41.1		0.9		T	
21 Jan		eP	14 54 02.3	9	1.0		T	8.6 N 82.8 W, h about 40 km
								0 = 14 47 57.0 Costa Rica
								Panama border region
21 Jan		eP	16 21 52.1	3	0.2			
		eS	22 01.2		0.3		L	Δ(S-P) = .6°
21 Jan		eP	22 09 45.1	15	0.9	SW		
		e	10 23.6		1.0			
		e	13 45.6		0.7		T	
22 Jan		eP	00 09 54.5	999	0.7	SW		
		e	10 06.2		0.7			
		e	16 45.1		1.0		T	
22 Jan		eP	00 23 54.0	12	1.4		T	
22 Jan		eP	00 24 46.3	2	0.6		T	
22 Jan		eP	03 14 01.2	7	0.9		T	
22 Jan		eP	03 37 55.6	3	1.0			11.9 S 166.2 E, h about 25 km
	LP	e	38 07		22.0			0 = 03 24 04.5 Santa Cruz
		epP	16.0		1.0			Islands Region. Mag. = 7 (Pas)
		e	40 27.7		1.0			6-1/4 - 6-1/2 (Berk). Strong
		e(PP)	42 11.6		1.4			surface waves on all systems
	LP	e(PP)	42 20		22.0			
	E	eSKKS	48 40.9		2.7			
	LPE	eSKKS	48		22.0			
	LPE	eS	49 35		20.0			
	LPN	e(PS)	51 21		25.0			
	LPN	e(PPS)	52 10		25.0			
		ePKKP	54 10.2		1.0			

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
	LPN	eSS		56	45		30.0			(Continuation from preceding page)
	LP	e(SKKS)	04	00	43					
	LP	eSur		07	00					
	LP	eSur		10	45					
		eSur		17	08.0				T	
22 Jan		eP	09	42	36.0	1	0.3		T	
22 Jan		eP	11	56	27.5	1	0.5		T	
22 Jan		eP	13	13	40.5	3	1.1		T	
22 Jan		eP	16	22	56.3	24	1.4			
		e		23	06.8		0.9			
		e		23	50.2		1.0		T	
22 Jan		eP	17	20	56.9	2	0.5		T	
22 Jan		eP	18	19	50.4	1	0.6		T	
22 Jan		eP	18	52	23.6	4	0.2			
		eS			28.4	999			L	Δ(S-P) = .3°
22 Jan		eP	19	51	44.4	3	0.8			
		e		52	36.6		0.6		T	
22 Jan	LP	eSur	19	55	00				T	12.3 S 166.1 E, h about 35 km
										0 = 19 04 54.1 Santa Cruz Island
22 Jan		iP	20	20	34.3	c15	0.7	SSE		
		e			47.6		0.8			
		e		21	05.8		0.6			
		e		22	08.0		0.6		T	
22 Jan		eP	20	47	03.9	1	0.4			
	E	eS			25.1		0.4		NR	Δ(S-P) = 1.5°
23 Jan		eP	03	32	49.2	3	1.0		T	
23 Jan		eP	04	22	03.2	1	0.6			
		e			14.9		1.0			
		e			26.9		0.6		T	
23 Jan		eP	04	41	23.2	1	0.6		T	
23 Jan		eP	04	56	56.0	1	0.5			
		e			58.9		1.1			
		e		57	16.0		0.7		T	
23 Jan		eP	05	00	45.9	15	0.9			42.9 N 145.3 E, h about 46 km
		epP			59.6		0.6			0 = 04 48 21.4 Hokkaido, Japan
		e		01	32.2		0.8		T	
23 Jan		eP	07	11	51.8	3	0.8		T	
23 Jan		eP	07	27	39.3	1	1.0		T	

DATE	Syst.	Phase	Arrival Time G.C.T.			Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h.	m.	s.					
23 Jan		eP	10	03	38.3	2	0.8		T	
23 Jan		eP	10	31	05.7	2	0.8		T	
23 Jan		eP	12	40	46.8	3	0.8		T	
23 Jan		eP	12	48	21.3	1	0.7			
		eSur		52	29.6		1.2		R	
23 Jan		eP	13	53	52.4	4	0.9		T	
23 Jan		eP	14	32	28.0		1.0		T	
23 Jan		eP	16	33	25.8	7	0.1			
		eS			28.8	999			L	Δ(S-P) = .2°
23 Jan		eP	18	10	57.1	1	0.4			
		eS		11	18.6	999			NR	Δ(S-P) = 1.5°
23 Jan		eP	19	24	34.2	3	0.5		T	
23 Jan		eP	19	53	55.6	2	0.5			
		eS		54	31.5		0.5		NR	Δ(S-P) = 2.9°
23 Jan		eP	20	07	12.2	1	0.6			
	N	eS			45.3		0.6		NR	Δ(S-P) = 2.5°
23 Jan		eP	21	51	16.5	2	0.6			
		eS		52	34.8		0.6		R	
23 Jan		eP	22	05	09.8	5	1.3			
		e		06	17.9		1.4		T	
23 Jan		eP	22	34	02.8	2	0.2			
		eS			25.5		0.3		NR	Δ(S-P) = 1.5°
24 Jan		eP	05	27	32.7	9	1.4		T	
24 Jan		eP	07	34	05.1	1	0.8		T	
24 Jan		eP	07	38	37.2	1	0.6			15.6 S 167.6 E, h about 198 km
		epP		39	18.9		0.8			0 = 07 25 03.5 New Hebrides
		ePP		42	49.6		1.4			Islands Region
		ePKKP		54	44.6		0.8		T	
24 Jan		eP	07	55	41.3	4	0.8			
		e		59	33.0		1.2		T	
24 Jan		eP'	08	21	35.4	1	0.7		T	61.1 S 152.1 E, h about 25 km
										0 = 08 02 28.7 Antarctic Ocean,
										south of Australia
24 Jan		eP	09	05	31.6	1	0.5		T	
24 Jan		eP	09	44	25.2	3	1.0		T	
24 Jan		eP	20	43	42.3	9	0.8		T	
24 Jan		eP	21	56	21.5	5	1.0		T	

DATE	Syst.	Phase	Arrival Time G.C.T.	Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h. m. s.					
24 Jan		eP	23 18 51.7	16	1.0			8.3 N 82.9 W, h about 78 km
		epP	19 06.6		0.9			0 = 23 12 49.0 Panama Costa
		e	36.2		1.4		T	Rica Border
24 Jan		eP	23 57 38.2	5	0.7		T	20.0 S 177.1 W, h about 211 km
								0 = 23 44 47.9 Tonga Islands
								Region
25 Jan		eP'	01 13 33.4	22	0.9			4.9 S 102.7 E, h about 135 km
		e	47.6		1.0		T	0 = 00 54 09.2 Near west
								coast of Sumatra
25 Jan		eP	01 19 41.4	3	0.9		T	
25 Jan		eP	03 54 09.4	2	0.7			0 80.2 W, h about 22 km
		epP	21.0		0.6		T	0 = 03 46 46.2 Near coast of
								Equador
25 Jan		eP	06 57 52.1	2	0.6			
		e	58 00.6		0.6		T	
25 Jan		eP	07 17 38.1	5	1.0		T	
25 Jan		eP	07 25 15.5	2	0.4		T	
25 Jan		eP	14 03 04.0	3	1.0		T	
25 Jan		eP	15 04 42.4	2	0.8		T	
25 Jan		eP'	17 39 38.8	8	1.4			1.2 N 121.3 E, h about 56 km
		e	42 22.7		1.2			0 = 17 20 34.7 Celebes
		eSKP	42 59.2		1.0		T	
25 Jan		eP	17 56 13.9	2	0.2			
		eS	22.4	999			L	Δ(S-P) = .5°
25 Jan		eP	18 33 15.7	3	0.8		T	
25 Jan		eP	18 33 54.0	1	0.6			
		e	34 07.7		0.9		T	
25 Jan		eP	19 15 46.9	20	0.8			49.8 N 156.0 E, h about 98 km
		epP	16 13.3		0.8			0 = 19 04 22.8 Kurile Islands
		ePP	18 24.2		1.0			LP inoperative
	E	eS	25 12.9		2.1			
25 Jan		eP	20 39 42.6	2	0.3			
		eS	40 29.5		0.5		NR	Δ(S-P) = 3.9°
26 Jan		eP'	02 06 01.6	2	0.9			15.3 N 93.7 E, h about 67 km
		e	09 56.8		1.4		T	0 = 01 47 01.4 Southern Burma
26 Jan		eP	03 27 37.8	2	0.6		T	
26 Jan		eP	05 46 30.0	1	0.5			
		eSur	50 15.6		1.4		R	

DATE	Syst.	Phase	Arrival Time G.C.T.	Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h. m. s.					
26 Jan		eP	07 22 37.6	2	0.6		T	
26 Jan		eP	07 57 12.5	2	0.5		T	
26 Jan		eP	08 56 08.4	3	1.0			
		e	09 00 13.0		1.6		T	
26 Jan		eP	13 35 08.1	3	1.0			
		e	37 03.5		1.7		T	
26 Jan	LP	eP	16 27 10		17.0			21.4 S 169.5 E, h about 119 km
	LP	ePP	31 40		21.0			0 = 16 13 25.1 Loyalty Islands
	LPN	eSKS	37 53		18.0			Mag. = 6-1/2 (Pas) 6 - 6-1/4
	BBE	ePS	40 42		15.0			(Berk). Strong surface waves on
	LPN	ePS	48		25.0			LP and BB
	BBE	ePPS	41 37		10.0			
	LPN	ePPS	48		22.0			
	LPN	ePKKS	46 37		27.0			
	LPE	eSKKS	50 28		28.0			
	LPN	eSKKKS	53 52		23.0			
	LPN	e	58 15		15.0			
	LP	eSur	17 02 10					
	LP	eSur	05 43					
26 Jan		eP	17 54 42.5	5	0.7			12.2 S 78.1 W, h about 60 km
		ePcP	55 55.1		1.0			0 = 17 45 42.9 Near coast of
		ePP	56 33.2		1.0		T	Peru
26 Jan	LP	eSur	19 38 40				T	20.7 S 169.5 E, h about 106 km
								0 = 18 48 56.9 Loyalty Islands
								Region. Weak surface waves on LP
26 Jan		eP	19 18 46.5	4	0.8			
		e	19 02.0		0.9		T	
26 Jan		eP	20 07 26.6	3	0.7		T	
26 Jan		eP	21 34 07.0	3	1.0		T	18.1 S 176.5 E, h about 25 km
								0 = 21 20 33.7 Fiji Islands
								Region
26 Jan		eP	21 55 05.0	2	0.6		T	
26 Jan		eP	22 43 05.6	2	0.2			
	E	eS	26.6		0.4		NR	Δ(S-P) = 1.5°
27 Jan		eP	01 09 57.3	1	0.7			
		e	10 06.8		1.4		T	
27 Jan		eP	01 10 42.3	2	0.6			
		e	11 08.4		1.8		T	

DATE	Syst.	Phase	Arrival Time G.C.T.			Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h.	m.	s.					
27 Jan		eP	02	38	25.3	1	0.5			
		e		40	03.4		0.7		T	
27 Jan		eP	03	55	39.8	5	1.0			
		e		56	13.6		1.0		T	
27 Jan		eP	06	30	54.8	2	0.6		T	
27 Jan		eP	10	57	32.9	.2	0.5			
		eSur	11	01	00.5		0.5		R	
27 Jan		eP	11	12	44.5	1	0.7			
		e			55.6		1.0		T	
27 Jan		eP	15	24	33.8	2	0.6		T	
27 Jan	LP	ePS	15	33	25		15.0			21.2 S 169.4 E, h about 68 km
	LPN	ePKKS		39	28		19.0			0 = 15 05 53.5 Loyalty Islands
	LP	e		43	21		20.0			Region. Weak surface waves
	LP	eSur		57	25				T	on LP
27 Jan		eP	17	19	57.1	2	0.7		T	
27 Jan		eP	18	52	26.7	4	1.0			
		e			43.4		1.2		T	
27 Jan		eP	20	19	02.0	5	0.8			45.4 N 149.3 E, h about 60 km
		epP			15.9		0.6		T	0 = 20 07 00.4 Kurile Islands
27 Jan		eP	21	39	40.0	1	0.2			
	E	eS		40	01.1		0.4		NR	Δ(S-P) = 1.5°
28 Jan		eP	00	57	28.2	1	0.5			
		e			36.3		0.6		T	
28 Jan		eP	02	07	38.4	3	0.8			
		e		08	11.8		0.8		T	
28 Jan		eP	03	33	52.6	12	0.8			13.6 S 76.6 W, h about 35 km
		epP		34	07.2		1.2			0 = 03 24 39.2 Near coast of
		ePcP		35	15.8		1.0			Peru. Mag. = 5 (Pal). Weak
	LPN	ePS		41	19.2		17.0			surface waves on LP
	LP	eSur		51	42.0				T	
28 Jan		eP	04	11	17.2	1	0.6			
		e			33.2		0.9		T	
28 Jan		eP	05	42	24.0	1	0.5			
		e			43.6		0.5		T	
28 Jan		eP	05	53	00.9	2	0.6		T	
28 Jan		eP	06	35	19.2	1	0.4			
		eSur		37	04.0	999			R	
28 Jan		eP	07	31	01.3	7	0.8		T	39.3 N 22.0 E, h about 89 km
										0 = 07 18 16.2 Northern Greece

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
28 Jan		eP	08	16	32.1	3	1.0			35.5 N 118.1 W, h about 21 km
		e			37.5		1.8			0 = 08 12 45.3 Kern County,
	E	e		17	44.3		1.8			California. Mag. = 5-1/4 -
	E	eSur		21	01.0		2.8			5-1/2 (Pas) 5-1/2 (Berk)
	BBN	eSur			08		3.5			Strong surface waves on BB, SP,
	BBE	eSur			35		17.0			and IB
	BB	eSur		22	40		8.0		R	
28 Jan		eP	10	06	41.9	5	1.0		T	
28 Jan		eP	12	24	48.2	1	0.6			
	E	eSur		28	25.4		0.6		R	
28 Jan		eP	12	27	06.5	3	1.0			
		eSur		28	30.7		1.0		R	
28 Jan		iP	14	18	18.8	c241	1.8			45.0 S 105.8 W, h about 144 km
		epP		19	09.4		1.0			0 = 14 06 21.0 South Pacific
		ePP		21	21.0		1.5		T	Ocean about 1200 miles south of
										Easter Island
28 Jan		eP	19	56	56.6	1	0.8			21.3 S 169.5 E, h about 50 km
		e		57	11.8		1.0			0 = 19 43 01.4 Loyalty Islands
	LPN	eSKS	20	07	43		15.0			Region. Mag. = 6-1/4 (Pas)
	LPN	ePS		10	30		19.0			6 (Pal). LPZ inoperative.
	LPN	ePKKS		16	40		20.0			
	LP	eSur		26	27					
	LP	eSur		33	05.0				T	
28 Jan		eP	20	48	21.9	1	0.4			
		eS		49	20.5		0.6		NR	Δ(S-P) = 5°
28 Jan		eP	21	24	55.8	1	0.6			
		eS		25	41.0		0.6		NR	Δ(S-P) = 3.6°
28 Jan		eP	23	54	52.9	1	0.5		T	
29 Jan		eP	03	07	34.6	3	1.0		T	
29 Jan		eP	13	33	34.0	24	1.1			51.8 N 175.9 W, h about 41 km
		e			46.8		1.1			0 = 13 23 54.7 Andreanof
	E	eS		41	21.0		2.4			Islands, Aleutian Islands
	LPN	eSur		52	38				T	
29 Jan		eP	18	52	22.3	2	0.5		T	
29 Jan		eP	20	53	52.7	2	0.3			
	E	eS		54	21.0		0.4		NR	Δ(S-P) = 2°

DATE	Syst.	Phase	Arrival Time G.C.T.	Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h. m. s.					
30 Jan		eP	01 47 51.0	1	0.6		T	
30 Jan		eP	05 37 03.5	5	0.8	NW		
		e	33.6		0.5		T	
30 Jan		eP	12 20 39.7	25	1.0			65.2 N 149.9 W, h about 34km
		e	21 49.4		1.2			0 = 12 12 39.7 Central Alaska
		e	23 14.2		1.0			Mag. = 5-1/2 (Pal) Strong surface
	LPE	ePcS	26 35.0		35.0			waves on all systems
		eSur	33 53.0		2.0			
	LP	eSur	35 03					
	LP	eSur	35 45.8				T	
30 Jan		eP	13 43 07.2	1	0.6		T	
30 Jan		eP	17 33 19.5	1	0.4			
	E	eSur	34 41.9		0.6		R	
30 Jan		eP	18 20 22.6	1	0.2			
	E	eS	45.7		0.5		NR	Δ(S-P) = 1.6°
31 Jan		eP	00 39 03.9	1	0.6		T	
31 Jan		eP	00 56 34.8	2	1.0			55.8 N 153.9 W, h about 26 km
	LP	ePP	58 05		12.0			0 = 00 48 36.5 Near Kodiak
		ePP	10.0		1.4			Island, Alaska. Mag. = 6-1/2
		ePcP	27.7		1.2			(Pas) 6 (Berk).
		e	59 14.7		1.0			Strong surface waves on all
		ePcS	01 02 09.4		2.4			systems
	LPN	eS	03 04		19.0			
	LPN	eScS	06 30		21.0			
	LP	eSur	08 43					
		eSur	14 23.0		4.4			
	LP	eSur	16 15.					
		eP'P'	28 37.3		0.6		T	
31 Jan		eP	02 11 34.4	2	0.8			
		e	40.6		0.7		T	
31 Jan		eP	04 34 18.2	1	0.6			
		eSur	35 55.0		1.0		R	
31 Jan		eP	05 23 22.2	1	0.6			
		e	36.8		0.6		T	
31 Jan		eP	08 39 26.5	3	1.0		T	
31 Jan		eP	12 56 17.5	1	0.7		T	

DATE	Syst.	Phase	Arrival Time G.C.T.	Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h. m. s.					
31 Jan		eP	15 36 23.6	2	0.2			
	N	eS	45.0	999	0.4		NR	Δ(S-P) = 1.6°
31 Jan		eP	18 42 09.5	5	0.6			51.4 N 178.4 W, h about 53 km
		e	20.2		0.6		T	0 = 18 32 19.5 Andreanof Islands, Aleutians Islands
31 Jan		eP	19 49 48.5	1	0.4			
		eS	50 40.0		0.6		NR	Δ(S-P) = 4°
31 Jan		eP	21 41 33.8	2	0.6			
	E	eSur	45 24.0		1.0		R	
31 Jan		eP	22 56 40.8	1	0.3			
	E	eS	57 02.8		0.4		NR	Δ(S-P) = 1.5°

Copied 4/5

WICHITA MOUNTAINS SEISMOLOGICAL OBSERVATORY
FORT SILL, OKLAHOMA, U.S.A.

Operated under the Technical Supervision of the
Air Force Technical Applications Center (AFTAC)

By
The Geotechnical Corporation, Garland, Texas

B. B. Leichliter, Chief Seismologist

REPORT ON THE REGISTRATION OF EARTHQUAKES FOR FEBRUARY 1961

Volume 1, No. 2

By Robert C. Shopland, Project Engineer;

Seismograms read by Gayle Stanfill and Cecil Morgan

Advanced Research Projects Agency (ARPA)
DEPARTMENT OF DEFENSE,
UNITED STATES GOVERNMENT

THE REGISTRATION OF EARTHQUAKES

AT THE

WICHITA MOUNTAINS SEISMOLOGICAL OBSERVATORY

STATION

STATION ABBREVIATION: WMSO
STATION IDENTIFICATION ON FILM SEISMOGRAMS:

GEOGRAPHICAL LOCATION *: (Vault No. 6)	34° 43' 05.3" N. Lat. 98° 35' 20.7" W. Long
GEOCENTRIC LOCATION *: (Vault No. 6)	34° 32' 09.8" N. Lat. 98° 35' 20.7" W. Long.
ALTITUDE (METERS) *: (Vault No. 6)	505 Meters (1658 feet)

GEOLOGY: The station is located on the Carlton (porphyritic) granophyre of the Wichita Mountains of Oklahoma.

NOISE LEVEL - February 1961: The periods of the predominant microseisms at WMSO are 0.5 second and 6 seconds. An amplitude distribution curve for the 0.5 second microseisms may be found on page 2.

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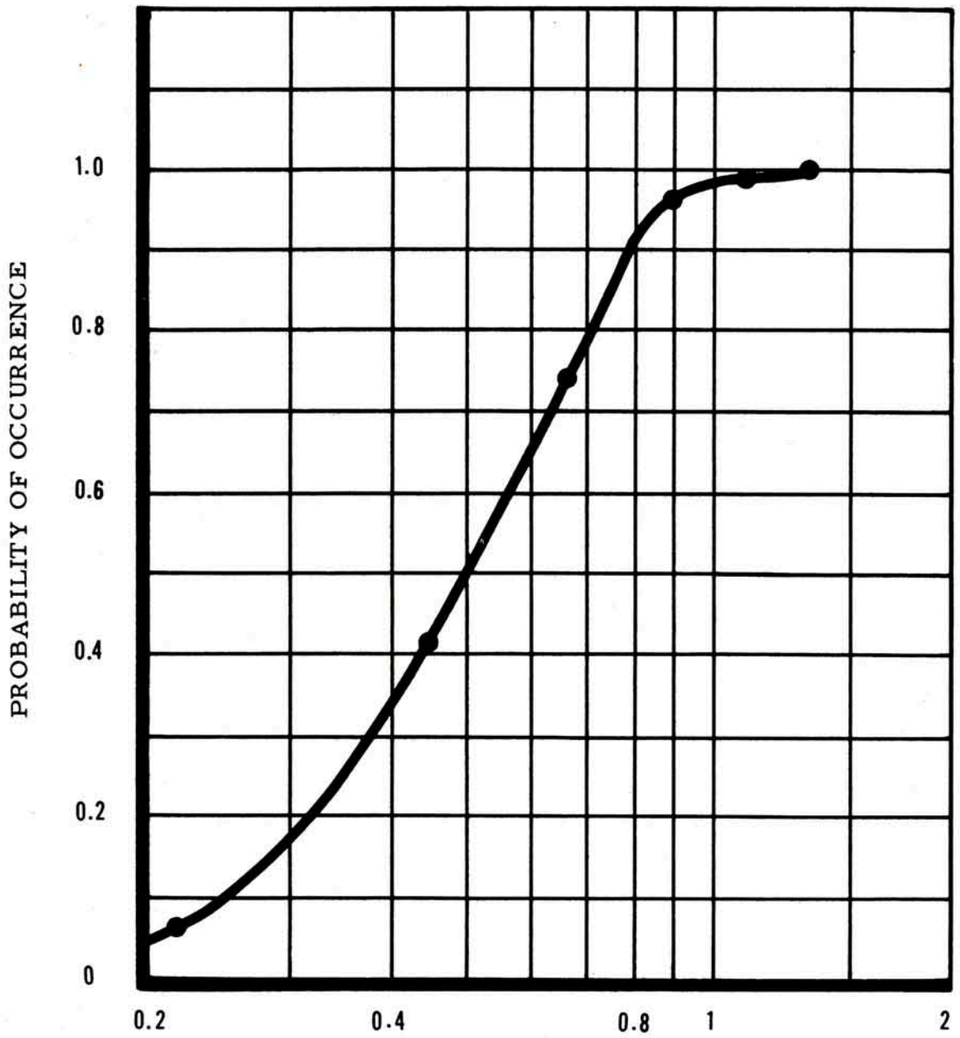
* The coordinates refer to the location of vault No. 6 which houses the 3-component groups of short-period and intermediate band seismometers from which arrival times are determined.



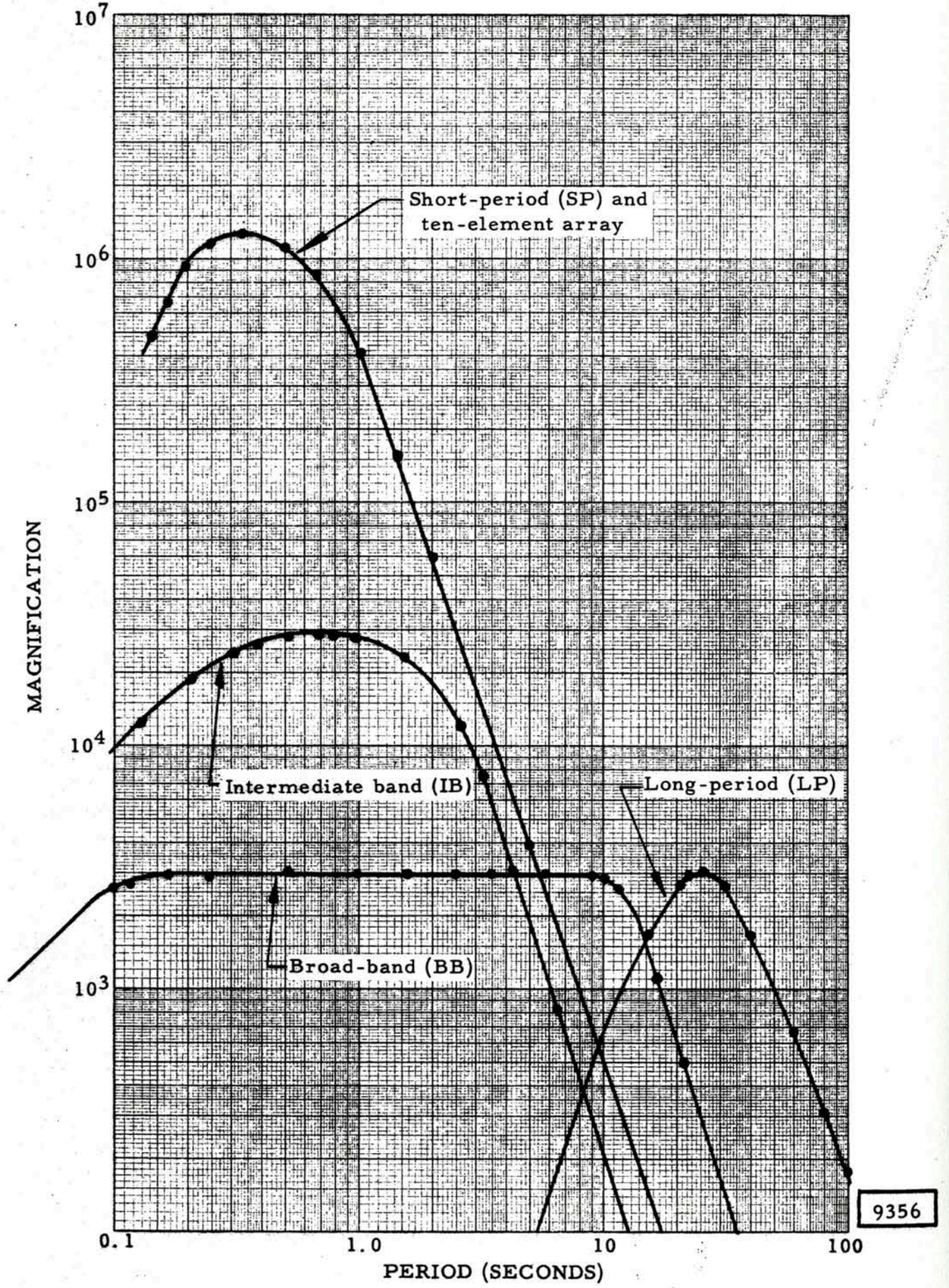
Probability of predominant 0.5-sec microseisms occurring at or less than a given amplitude at Unity magnification

SEISMOGRAPHS

	Ts	λs	Tg	λg	σ^2
SP Vertical Benioff	1.0	1.0	0.2	1.0	0.01
SP Horizontal Benioff	1.0	1.0	0.2	1.0	0.01
IB Vertical Melton	2.5	0.65	0.64	1.5	0.002
IB Horizontal Sprengnether	2.5	0.65	0.64	1.5	0.0005
BB Vertical Press-Ewing	12.5	0.4	0.64	9.0	0.0002
BB Horizontal Sprengnether	12.5	0.4	0.64	9.0	0.0004
LP Vertical Sprengnether	25.0	1.0	30	1.0	0.004
LP Horizontal Sprengnether	25.0	1.0	30	1.0	0.004

SP = Short Period
IB = Intermediate Band
BB = Broad Band
LP = Long Period
Ts = Free Period of seismometer in secs.
λs = Damping constant of seismometer
Tg = Free Period of Galvanometer in secs.
λg = Damping constant of Galvanometer
σ^2 = Coupling Coefficient

NOTE: Response curves may be found on page 4.



Response characteristics of seismographs

INTERPRETATION OF SYMBOLS

1. Earthquakes Listed

All local (L), near-regional (NR), regional (R), and distant earthquakes (T) are tabulated on the following pages.

2. System

In the column headed "Syst." (system), the seismograph (SP, IB, BB, or LP) and component (Z, N, or E) used to measure arrival time are designated. When no component designation appears, the phase is read from the vertical component. When neither system nor component designation appears, the phase is read from the SP vertical component.

3. Phase

(1) "i" (impetus) preceding a phase designates sudden beginning of the motion. (A designation of "i" in the case of initial P motion indicates a signal-to-noise ratio exceeding about 5/1).
(2) "e" (emersio) designates gradual beginning.
(3) "i" or "e" alone designates an unidentified phase.
(4) ( ) (parenthesis marks) indicate uncertainty.

4. Time

(1) Date and arrival time are given in Greenwich Civil Time (G. C. T.).
(2) The arrival time is reported as the earliest time on Z, N, or E. Single Z rather than the array summation (Σ) is used for measuring arrival times on the SP seismographs.

5. Ground Motion

(1) In the columns headed "A" and "T" are tabulated earth displacement in millimicrons and period in seconds, respectively. An amplitude of 999 indicates that a signal cannot be measured reliably. A "c" or "d" in the "A" column indicates compression or dilation, respectively, of the ground as indicated by the vertical component instrument.

The value of "A" for P phases is the maximum amplitude in the first ten seconds. All amplitudes are center-to-peak amplitudes.

(2) Trace amplitudes are measured to the nearest 1/2 millimeter at X10 view.

6. Direction

In the column headed "Dir." (direction), the direction of the epicenter as viewed from WMSO is indicated. For teleseisms, direction is obtained only from P and Rayleigh waves and is listed opposite the phase from which it is obtained. For close events, direction may be obtained from P-wave step-out shown on the individual short-period vertical traces.

7. Type

Earthquakes are identified as either:

L	(local) - - - - - - - - - -	0°	- 1.4°
NR	(near-regional) - - - - -	1.4°	- 6°
R	(regional) - - - - - - - -	6°	- 16°
T	(teleseismic) - - - - - - -	16°	- 180°

8. Remarks Column

(1) Epicentral locations, time of origins, depth of focii, and magnitudes are obtained from the U.S. Coast and Geodetic Survey Preliminary Determination of Epicenters cards.

(2) The nature of the surface waves is indicated subjectively.

(3) Epicentral locations and distances reported by the station are accompanied by an indication of the phases used to determine epicentral distance, e.g. Δ (S-P) = 6°, Central Colorado.

(4) Operational notes refer to operational difficulties that affect analysis of data.

DATE	Syst.	Phase	Arrival Time G.C.T.	Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h. m. s.					
01 Feb		eP	00 08 27.6	1	0.3			
	E	eS	48.0		0.4		NR	Δ(S-P) = 1.4°
01 Feb		eP	00 20 45.1	5	0.7	NNW		
		eS	50.0		0.7		L	Δ(S-P) = 0.1°
01 Feb		eP	00 25 27.4	2	0.9			
		e	48.2		1.0		T	
01 Feb		iP	00 41 44.6	c 18	1.0			50.2 N 129.7 W, h about 42 km
		e	42 54.0		1.9			0 = 00 36 00.3 Off coast of
	LPE	e(S)	46 40		20.0			Vancouver Island. Strong
	LP	e	50 37		35.0			surface waves on LP
	LPE	e	51 10		30.0			
	BBE	e	34		15.0			
	LPE	eScS	52 34		20.0		T	
01 Feb		eP	03 14 15.0	1	0.6		T	
01 Feb		eP	04 02 09.0	1	0.4			
	E	eSur	06 01.4		0.6		R	
01 Feb		eP	05 12 04.4	2	1.0		T	
01 Feb		eP	05 25 23.0	1	0.9		T	
01 Feb		eP	06 40 46.6	1	0.5		T	13.5 S 173.4 E, h about 25 km
								0 = 06 27 18.9 East of New
								Hebrides Islands
01 Feb		eP	07 53 27.6	2	0.8			
		e	29.9		1.3			
	LPE	e	08 05 03.0		20.0		T	
01 Feb		eP	09 03 48.4	1	0.9		T	
01 Feb		eP	11 32 14.4	3	0.8			
		e	16.8		0.8			
	E	eSur	36 02.8		0.8		R	
01 Feb		eP	12 22 10.6	3	0.2			
	E	eS	24.8	999			L	Δ(S-P) = 0.9°
01 Feb		eP	12 26 28.7	1	0.6			
		e	35.5		0.6		T	
01 Feb		eP	12 49 04.8	1	0.6		T	
01 Feb		eP	16 38 32.7	2	0.8		T	
01 Feb		iP	17 27 12.2	c 25	0.3			
		eS	15.6	999			L	Δ(S-P) = 0.1°
01 Feb		eP	18 01 08.2	2	0.2			
	E	eS	29.9		0.3		NR	Δ(S-P) = 1.6°
01 Feb		eP	20 21 25.0	7	0.9		T	18.0 S 178.4 W, h about 599 km
								0 = 20 09 13.8 Fiji Islands

DATE	Syst.	Phase	Arrival Time G.C.T.			Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h.	m.	s.					
01 Feb		eP	20	24	40.8	1	0.2			
	E	eS			45.0		0.4		L	Δ(S-P) = 0.2°
01 Feb		eP	21	19	09.7	2	0.6		T	
01 Feb		eP	21	35	52.3	4	0.4			
	E	eS		36	13.3	999			NR	Δ(S-P) = 1.5°
01 Feb		eP	22	54	42.1	1	0.5			
	E	eSur		56	05.9		0.5		R	
02 Feb		eP	00	08	10.0	6	1.0			37.2 N 118.6 W, h about 25 km
	LPN	eSur		12	50		15.0		R	0 = 00 04 16.3 Inyo County, California. Mag. = 4-3/4 - 5 (Pas) 5 - 5-1/4 (Berk). Strong surface waves on all systems
02 Feb		eP	00	11	40.4	12	1.1			
	N	eSur	01	16	16.8		2.5			Strong surface waves on SP
	LPN	eSur			55				R	and LP
02 Feb		eP'	01	00	46.4	3	1.0		T	7.3 N 127.3 E, h about 157 km 0 = 00 42 07.2 Near South coast of Mindanao P.I.
02 Feb		eP	01	10	57.0	1	0.6		T	Possible PKKP of previous event
02 Feb		eP	02	05	46.4	1	0.4			
	E	eSur		10	01.6		0.5		R	
02 Feb		eP	02	22	20.7	1	0.6		T	
02 Feb		eP	05	55	02.7	32	1.4			
		e			20.5		1.0		T	
02 Feb		eP	09	50	10.0	4	0.8			
		e			34.2		0.6		T	
02 Feb		ePP	11	31	35.5		1.2			13.6 N 145.3 E, h about 131 km
		ePKKP		43	36.7	3	0.8		T	0 = 11 13 31.8 Mariana Islands
02 Feb		eP	16	02	06.7	2	0.3			
	E	eS			09.7		0.5		L	Δ(S-P) = 0.1°
02 Feb		eP	16	09	21.0	1	0.5		T	
02 Feb		eP	17	42	34.9	2	0.3			
	N	eS			36.7		0.4		L	Δ(S-P) = 0.1°
02 Feb		eP	20	30	58.4	2	0.8		T	
02 Feb		eP	21	25	39.0	1	0.5			
	E	eSur		26	24.5		0.5		NR	
02 Feb		eP	21	42	20.2	1	0.3			
	N	eSur			57.0		0.5		NR	
02 Feb		eP	22	25	39.8	1	0.7			
		e			47.0		0.7		T	

DATE	Syst.	Phase	Arrival Time G.C.T.			Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h.	m.	s.					
02 Feb		eP	23	30	33.9	999				
	N	eS			42.0	999		NW	L	Δ(S-P) = 0.4°
03 Feb		eP	01	39	01.6	1	0.6		T	
03 Feb		eP	02	05	59.2	2	0.6		T	
03 Feb		eP'	02	45	13.0	1	0.5		T	3.4 N 97.1 E, h about 15 km 0 = 02 25 51.5 Near coast of Sumatra
03 Feb		eP	03	08	41.7	3	0.7			
		e		09	25.3		0.6		T	
03 Feb		eP	05	45	57.0	1	0.6		T	
03 Feb		eP	06	59	07.3	3	0.5			
		e(pP)			26.5		0.8		T	
03 Feb		eP	08	14	45.2	2	0.8		T	
03 Feb		eP	11	14	14.3	1	1.0			33.3 S 72.3 W, h about 27 km
		e			25.0		1.3		T	0 = 11 02 51.7 Near coast of Central Chile
03 Feb		eP	12	11	55.3	3	0.9			33.2 S 72.2 W, h about 22 km
		e		13	09.2		1.6		T	0 = 12 00 25.3 Near coast of Central Chile
03 Feb		ePP	12	51	35.9		1.4		T	36.9 S, 176.8 E, h about 300 km 0 = 12 33 22.8 Off north coast of North Island, New Zealand
03 Feb		eP	13	44	37.8	2	0.7		T	36.4 N 141.0 E, h about 103 km 0 = 13 31 44.7 Honshu, Japan
03 Feb		eP	14	18	32.0	2	0.9			33.3 S 73.1 W, h about 25 km
		e			41.6		1.2		T	0 = 14 07 07.7 Off coast of Chile
03 Feb		eP	14	36	06.1	3	0.8			23.4 S 67.3 W, h about 181 km
		ePcP			39.6		0.7			0 = 14 25 41.7 Jujuy Province,
		ePP		38	27.5		1.2		T	Argentina
03 Feb		eP	14	47	28.9	36	1.2			
		e			37.6		1.2		T	
03 Feb		eP	17	42	13.3	4	0.2			
	E	eS			15.5		0.4		L	Δ(S-P) = 0.1°
		eP	17	42	30.6	4	0.2			
	N	eS			32.7		0.4		L	Δ(S-P) = 0.1°

DATE	Syst.	Phase	Arrival Time G.C.T.	Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h. m. s.					
03 Feb		eP	17 42 44.3	999	0.2			
		eS	46.4		0.4		L	Δ(S-P) = 0.1°
03 Feb		eP	17 43 02.0	6	0.2			
	E	eS	05.3		0.4		L	Δ(S-P) = 0.1°
03 Feb		eP	17 55 49.3	4	0.2			
	E	eS	52.4		0.4		L	Δ(S-P) = 0.1°
03 Feb		eP	22 39 23.3	1	0.1			
	E	eS	45.1		0.3		NR	Δ(S-P) = 1.6°
03 Feb		eP	23 51 26.2	2	0.8		T	
03 Feb		eP	23 52 31.6	3	0.8		T	
04 Feb		eP	01 21 16.8	2	0.6		T	
04 Feb		iP	01 22 54.5	d 21	0.8			18.3 S 69.3 W, h about 178 km
		e(pP)	23 22.3		0.8			0 = 01 13 05.0 Chile - Bolivia
		ePcP	40.2		0.6			Border
		ePP	25 06.0		1.0			
	N	e	01 30 30.8		2.5			
	E	eS	31 00.4		1.5			
	N	e	45.4		2.0		T	
04 Feb		eP	01 59 58.7	5	1.0		T	
04 Feb		eP	03 07 39.9	9	1.0			
		e	08 51.9		0.8		T	
04 Feb		eP	05 23 39.1	2	0.8		T	
04 Feb		eP	06 53 57.3	77	0.8	SE		
	E	e	58 18.4		2.0			
	BBE	e	52		12.5			
		e	59 59.8		1.8			
		e	07 01 28.0		0.8			
	BBE	e	05 14		8.0			
	BBE	e	18 53		7.0		T	
04 Feb		eP	07 05 28.0	3	0.8			
		e	34.8		0.8		T	
04 Feb		eP	07 19 59.6	8	0.9	SE		
		e	20 07.4		0.8			
		e	12.1		0.8			
		e	19.8		0.7			
		e	23.7		0.7		T	
04 Feb		eP	08 16 19.4	2	0.5		T	
04 Feb		eP	08 53 14.0	3	0.7		T	

DATE	Syst.	Phase	Arrival Time G.C.T.	Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h. m. s.					
04 Feb		eP'	09 10 22.1	5	1.3			24.7 N 95.3 E, h about 162 km
		e	33.4		0.5			0 = 08 51 48.9 Northern
		e	57.1		0.8		T	Burma
04 Feb		eP	09 10 59.4	3	0.6			
		e	12 19.0		2.0		T	
04 Feb		eP	09 20 35.3	18	1.1			
		e	24 16.0		1.0			
		e	25 05.2		1.0		T	
04 Feb		eP	09 56 39.4	4	0.3			
	E	eS	57 04.3		0.3		NR	Δ(S-P) = 1.5°
04 Feb		eP	10 19 32.0	2	0.7		T	
04 Feb		eP	10 27 55.9	1	0.7			
		e	28 04.4		0.7		T	
04 Feb		eP	11 14 32.1	1	0.7		T	
04 Feb		eP	11 20 31.7	1	0.5			
		eSur	24 22.4		1.0		R	
04 Feb		eP	11 32 23.9	2	0.8		T	
04 Feb		eP	12 23 28.4	1	0.7		T	
04 Feb		eP	13 00 49.8	21	0.8			50.3 N 156.4 E, h about 161 km
		ePcP	01 11.3		0.6			0 = 12 49 37.7 Kamchatka
		ePP	03 27.0		1.7		T	
04 Feb		eP	13 58 21.1	2	0.6			
		e	27.5		0.6		T	
04 Feb		eP	14 29 17.0	2	0.7		T	
04 Feb		eP	15 29 20.8	2	0.8		T	
04 Feb		eP	15 35 53.4	44	1.4	SE		
		e	36 02.7		1.2		T	
04 Feb		eP	15 42 10.0	3	1.0		T	17.0 S 176.8 W, h about 57 km
								0 = 15 29 11.7 Fiji Islands
								Region
04 Feb		eP	16 16 43.0	12	0.6			11.8 N 87.5 W, h about 79 km
		e	17 10.5		0.9			0 = 16 11 23.6 Near coast of
		ePP	19.5		1.1		T	Nicaragua
04 Feb		eP	16 59 08.2	2	0.7			
		e	25.0		1.1		T	
04 Feb		eP	17 27 14.8	2	0.8			
		e	22.2		0.7		T	
04 Feb		eP	19 25 04.1	3	0.9		T	

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
04 Feb		ePP	19	28	29.1	2	2.0		T	24.0 N 122.7 E, h about 14 km
										0 = 19 09 12.9 Off East
										Coast of Formosa
04 Feb		eP	19	38	59.2	1	0.7		T	
04 Feb		eP	20	22	16.5	2	0.2			Δ(S-P) = 1.6°
	E	eS			38.2		999		NR	
04 Feb		eP	21	02	14.9	1	0.4			Δ(S-P) = 3°
	E	eS			54.2		0.5		NR	
04 Feb		eP	21	21	23.1	1	0.7		T	
04 Feb		eP	22	26	40.4	3	1.0		T	
05 Feb		eP	00	11	02.2	2	0.7		T	45.3 N 148.2 E, h about 25 km
										0 = 23 58 52.4 Kurile Islands
05 Feb		eP	06	16	01.8	5	0.9		T	
05 Feb		eP	07	52	06.9	5	0.9		T	17.7 S 178.4 W, h about 590 km
										0 = 07 39 57.9 Fiji Islands
05 Feb		eP	08	05	28.0	1	0.6			
		e			40.7		0.7		T	
05 Feb		eP	08	20	24.1	2	1.1		T	
05 Feb		eP	10	31	08.3	2	0.7		T	
05 Feb		eP	11	30	44.9	1	0.7		T	
05 Feb		eP	12	17	31.9	1	0.6		T	
05 Feb		eP	15	44	43.0	51	1.2			8.0 N 82.8 W, h about 49 km
	IB	e		46	01		4.5			0 = 15 38 34.0 South of
		ePcP		47	45.6		0.9			Panama
	LPE	eS		50	15		23.0			Strong surface waves on LP
	LPN	ePcS		51	29		26.0			
		e		52	15.3		4.2			
	LPN	e			28		23.0			
	LPN	eSur		53	46					
	LPN	eSur		56	04					
	LPN	eSur		58	32				T	
05 Feb		eP	18	09	29.3	2	0.9		T	
05 Feb		eP'	18	11	04.9	8	1.0			38.4 S 78.2 E, h about 25 km
		e		12	38.9		1.0			0 = 17 50 51.1 Indian Ocean
		ePP		16	44.5		1.4		T	
05 Feb		eP	18	32	39.5	1	0.8		T	
05 Feb		eP	19	15	01.2	1	0.7		T	
05 Feb		eP	19	40	37.5	1	1.0		T	
05 Feb		eP	19	48	56.2	2	0.8		T	
05 Feb		eP	23	42	21.7	1	0.7		T	

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
06 Feb		eP	00	05	11.6	1	0.7		T	
06 Feb		eP	00	54	26.3	2	0.9		T	
06 Feb		eP	00	59	21.7	1	0.7		T	
06 Feb		eP	10	40	02.0	22	1.0			19.2 S 68.6 W, h about 181 km
		epP			33.0		1.0			0 = 10 30 07.2 Chile-Bolivia
		ePcP			45.9		1.0			border
		eS		48	09.3		1.6		T	SP N-S, E-W inoperative
06 Feb		eP	11	14	52.5	12	0.8			
		e		15	07.7		1.0			
		e		22	16.0		1.0		T	
06 Feb		eP	11	38	26.5	4	1.5			
		e			53.0		0.8		T	
06 Feb		eP	12	21	56.0	999				51.6 N 174.8 W, h about 77 km
		e		22	06.0		1.0			0 = 12 12 26.0 Andreanof
		e			09.6		0.9		T	Island, Aleutian Islands
										Mag. = 5-1/4 - 5-1/2 (Pal)
06 Feb		eP	14	25	35.0	1	0.6			
		e			42.5		0.7		T	
06 Feb		eP	15	15	00.5	4	0.8		T	
06 Feb		eP	16	32	36.2	02	0.8		T	
06 Feb		eP	17	56	06.7	2	0.9		T	
06 Feb		eP	18	14	04.1	3	1.0		T	
06 Feb		eP	18	27	30.0	13	0.9			44.8 N 149.1 E, h about 25 km
		e			41.9		0.9			0 = 18 15 21.6 Kurile Islands
		ePKKP		46	16.9		1.0		T	
06 Feb		eP	19	42	56.7	1	0.7			4.8S 154.2 E, h about 470 km
		e		47	10.1		0.9			0 = 19 29 33.2 Solomon
		ePP		47	31.7		1.4		T	Islands Region
06 Feb		eP	20	05	20.0	1	0.4			
	N	eSur			55.3		0.5		NR	
06 Feb		eP	20	38	48.4	1	0.9			
		e		40	23.8		0.9		T	
06 Feb		eP	20	44	32.2	2	0.7		T	
06 Feb		eP	21	25	05.6	2	0.7		T	

DATE	Syst.	Phase	Arrival Time G.C.T.			Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h.	m.	s.					
06 Feb		eP	21	59	28.9	2	0.7			6.8 S 155.3 E, h about 59 km
		e	22	03	04.6		1.5			0 = 21 45 13.5 Solomon
		e(P')			36.4	2	0.6			Islands
		ePP		04	00.0		3.0			Strong surface waves on LP
	IB	e			17		3.0			and BB
		e		05	04.4		1.8			
	LPN	e		06	41		40.0			
	LPN	ePS		13	06		23.0			
	BB	ePS			17		6.0			
	LPN	e		14	41		27.0			
	IB	e		14	55		3.0			
		ePKKP		15	08.3		1.3			
	LPN	e		19	58		33.0			
	LPN	ePPP		23	08		40.0			
		e(P'P')			19.4		1.2			
	LPN	e		26	35		41.0			
	LPN	eSur		29	31					
	LPN			34	30				T	
06 Feb		eP	22	16	06.2	9	0.7		T	Possibly PKKP of Solomon event
06 Feb		iP	22	16	13.1	41	0.7	NE	T	Possibly PKKP of Solomon event
07 Feb		eP	00	52	11.5	3	1.0		T	
07 Feb		eP	01	04	16.0	1	0.5		T	
07 Feb		eP	02	13	46.7	4	1.0		T	
07 Feb		eP	03	16	53.8	3	0.6			
		e			59.5		0.7			
		e		18	38.8		1.4		T	
07 Feb		eP	03	26	03.3	20	0.7	SE		
		e		28	23.1		0.7			
		e		30	05.8		1.6			
		e			22.5		0.6			
		e		31	19.8		1.2		T	
07 Feb		eP'	05	31	11.4	46	0.8			4.1 S 103.3 E, h about 82 km
		e			27.9		0.9			0 = 05 11 45.0 Sumatra
		e		32	41.8		1.1		T	

DATE	Syst.	Phase	Arrival Time G.C.T.			Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h.	m.	s.					
07 Feb		eP	06	14	12.4	14	1.6		T	48.8 N 129.3 W, h about 46 km
										0 = 06 08 31.2 Off coast of
										Vancouver Island
07 Feb		eP	06	45	21.8	12	0.8			
		e			29.4		0.8			
		e		58	45.5		1.2		T	
07 Feb		eP	07	37	09.0	2	0.6		T	
07 Feb		eP	14	35	55.4	2	0.6			33.1 S 72.5 W, h about 56 km
		e		36	05.0		0.9			0 = 14 24 35.7 Near coast of
		e		37	00.5		0.7		T	central Chile
07 Feb		eP	15	05	52.0	9	1.4			
		e		06	02.7		0.8		T	
07 Feb		eP	21	13	54.8	7	1.0			43.9 N 147.1 E, h about 36 km
		e(pP)		14	05.4		0.8			0 = 21 01 37.3 Kurile Islands
		e			19.0		0.8		T	
07 Feb		eP	22	21	09.8	2	0.7			49.3 N 156.3 E, h about 60 km
		ePcP			27.0		0.7		T	0 = 22 09 41.5 Kurile Islands
07 Feb		iP	23	36	59.7	c 49	1.3			51.4 N 177.2 W, h about 15 km
		e		37	15.6		1.4		T	0 = 23 27 10.8 Andreanof
										Islands, Aleutian Islands
08 Feb		eP	02	00	12.6	3	1.0		T	
08 Feb		eP	02	50	18.2	1	0.8			15.3 S 167.5 E, h about 162 km
		ePP		54	30.4		1.3		T	0 = 02 36 40.5 New Hebrides
										Islands Region
08 Feb		eP	03	06	22.7	1	0.6			
		e			47.9		0.9		T	
08 Feb		eP	03	14	40.0	2	1.1		T	
08 Feb		eP	03	31	31.3	8	1.5		T	
08 Feb		eP	04	47	24.5	1	0.7		T	26.1 S 178.8 W, h about 431 km
										0 = 04 34 35.4 Kermadec
										Islands Region
08 Feb		eP	06	26	29.2	5	1.0			
		e			35.6		1.3		T	

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T.	Dir.	Type	Remarks
1961										
08 Feb		eP	08	12	29.4	212	0.7			10.6 S 71.0 W, h about 669 km
	IB	e			58.5		0.7			0 = 08 04 13.8 Brazil-Peru
		ePcP		13	32.5		0.6			border. Mag. = 5-3/4 (Pas)
		epP		14	24.5		1.0			P'P' possibly new event
		eScP		16	30.0		0.8			
		ePcS		17	17.2		0.8			
	E	eS		19	08.1		1.4			
	N	eScS		21	14.0		1.9			
		e(P'P')		42	21.5		1.2		T	
08 Feb		eP	08	49	47.6	5	0.8		T	
08 Feb		eP	09	57	03.6	2	1.1		T	
08 Feb		eP	10	04	41.7	1	0.9		T	
08 Feb		eP	11	52	28.4	999	0.3	W		Δ(S-P) = 1.8°
		eS			51.6	999	0.4		NR	
08 Feb		eP	12	12	46.9	7	0.7		T	18.8 S 174.9 W, h about 76 km
										0 = 11 59 52.3 Tonga Islands
08 Feb		eP	16	04	11.5	1	1.0		T	
08 Feb		eP	16	10	07.8	1	0.7		T	
08 Feb		eP	17	09	43.6	3	0.9		T	20.4 S 178.1 W, h about 543 km
										0 = 16 57 23.3 Tonga Islands
										region
08 Feb		eP	17	29	18.1	1	0.6		T	
08 Feb		eP	17	51	48.5	2	0.6		T	
08 Feb		eP	18	03	05.5	6	0.9			20.4 S 178.1 W, h about 543 km
		epP		05	07.9		0.8			0 = 17 50 45.2 Tonga Islands
	N	e(S)		13	32.9		1.4			
	E	e		14	02.6		3.3		T	
08 Feb		eP	21	30	23.1	1	0.7			
		e		31	30.2		0.7		T	
08 Feb		eP	21	32	18.1	7	1.2		T	
08 Feb		eP	23	24	07.8	1	0.6		T	
09 Feb		eP	02	21	47.8	71	1.4			28.2 S 177.4 W, h about 37 km
		e		22	05.2		1.6			0 = 02 08 15.9 Kermadec
		e		24	09.7		2.0			Islands region. Mag. = 6-3/4
		e			37.0		1.7			(Pas) 6-1/4 (Berk)
		e		25	46.2		2.0			
		ePP			58.5		2.2			
	IB	ePPP		27	30		8.0			

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
	N	eSKS		32	23.0		2.2			(continuation from preceding
	E	eSKKS			45.5		2.5			page)
	LPN	ePS		34	43		24.0			
		$ePKKP_1$		38	26.7		0.9			
		$ePKKP_2$			55.6		0.9			
	LP	eSS		39	53		25.0			
		eP'P'		46	37.0		0.8			
	LPN	eSur		53	32				T	
09 Feb		eP	04	13	20.1	3	0.9		T	
	LPN	e		28	46		26.0		T	
09 Feb		eP	05	19	20.5	1	0.8		T	
09 Feb		eP	06	40	15.1	1	0.7			
		e			26.6		0.8		T	
09 Feb		eP	07	29	11.4	1	0.9			
		e			25.6		0.9		T	
09 Feb		eP	08	51	45.5	2	0.8		T	
09 Feb		eP	09	34	00.8	2	1.1			
		e			25.8		0.9		T	
09 Feb		eP	12	01	26.3	1	0.7			
		e			52.4		0.7		T	
09 Feb		eP	13	26	41.0	2	0.8		T	38.9S 72.6 W, h about 25 km
										0 = 13 14 45.6 Near coast of
										Chile
09 Feb		eP	15	56	43.5	3	0.2			
		eP			53.0		0.3			
	E	eS		57	05.0		0.5		NR	Δ(S-P) = 1.7°
09 Feb		eP	17	54	12.0	2	0.9			
		e			24.4		1.0			
		e			37.8		1.0			
	N	eSur		58	28.0		2.1		R	
09 Feb		eP'	20	40	49.9	1	0.5			9.9 S 111.3 E, h about 73 km
		e		41	05.7		1.0		T	0 = 20 21 20.1 Off south coast
										of Java
09 Feb		eP	20	41	56.4	1	0.2			Δ(S-P) = 1.9°
	E	eS		42	21.4		0.5		NR	
09 Feb		eP	21	07	27.5	2	0.7		T	
09 Feb		eP	21	22	39.1	9	0.7			
		e			50.4		0.7		T	
09 Feb		eP	22	49	13.7	1	0.9		T	

DATE	Syst.	Phase	Arrival Time G.C.T.	Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h. m. s.					
10 Feb		eP	01 39 34.6	2	0.8		T	
10 Feb		eP	01 58 31.5	1	0.6		T	
10 Feb		eP	02 57 29.8	6	1.4		T	
10 Feb		eP	04 55 17.6	6	0.7		T	
10 Feb		eP	07 34 11.9	3	1.1		T	32.9 S 70.0 W, h about 230 km
								0 = 07 23 04.9 Central Chile
10 Feb		eP	08 22 49.4	2	0.9		T	
10 Feb		eP	08 58 21.8	3	1.0			
		e	59 34.6		0.6		T	
10 Feb		eP	09 56 50.7	1	0.8			
		e	59 29.9		0.9		T	
10 Feb		eP	10 58 13.9	1	0.8		T	
10 Feb		eP	12 16 42.9	8	0.7			
		e	24 13.7		0.9		T	
10 Feb		eP	13 09 31.0	2	0.7		T	
10 Feb		eP'	13 38 26.6	5	1.3			2.9 S 127.6 E, h about 78 km
		e	35.6		1.2			0 = 13 19 26.6 Ceram Sea
		e(PP)	40 39.9		0.9		T	
10 Feb		eP	16 21 12.1	1	0.6			
		eSur	23 04.8		0.6		R	
10 Feb		eP	16 27 49.8	3	1.1		T	
10 Feb		eP	17 56 20.2	1	0.7		T	
10 Feb		eP	18 27 52.4	3	1.0			
		e	28 02.0		1.4		T	
11 Feb		eP	00 12 23.5	1	0.5			
	E	eS	50.8		0.5		NR	Δ(S-P) = 2.1°
11 Feb		eP	01 15 04.3	3	0.7		T	
11 Feb		eP	04 01 36.7	3	0.8		T	
11 Feb		eP	04 22 12.6	1	0.4			
		eS	34.6		0.4		NR	Δ(S-P) = 1.6°
11 Feb		eP	06 25 15.2	5	1.1			28.8 N 139.5 E, h about 358 km
	✓	epP	26 53.6		1.2		T	0 =06 12 23.2 North of Bonin Islands region
11 Feb		eP	06 28 41.0	48	1.8		T	
11 Feb		eP	06 42 31.8	1	0.5			
	LP	e	55 45		28.0		T	

DATE	Syst.	Phase	Arrival Time G.C.T.	Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h. m. s.					
11 Feb		iP	11 38 25.5	d 24	1.0			23.3 S 65.9 W, h about 195 km
		e	42.9		1.0			0 = 11 27 59.4 Jujuy Province,
		ePcP	56.2		1.1			Argentina
		e(pP)	39 22.2		1.2			
		ePP	40 46.6		1.1		T	
11 Feb		eP	12 34 14.6	2	0.9		T	
11 Feb		eP'	12 42 33.6	2	0.6		T	5.2 N 126.3 E, h about 200 km
								0 = 12 23 55.8 Near coast of
								Mindanao P.I.
11 Feb		eP	14 31 07.0	7	1.0			
		e	34.2		0.9		T	
11 Feb		eP	14 55 23.7	1	0.7		T	
11 Feb		eP	16 45 39.0	1	0.7		T	
11 Feb		iP	16 59 05.7	c 16	0.9			19.8 S 176.2 W, h about 261 km
		epP	17 00 04.5		1.2			0 = 16 46 24.6 Fiji Islands
		e	19.3		1.1			
	E	eSKS	09 51.1		2.4		T	
11 Feb		eP	20 42 10.0	1	0.6			
		eS	43 02.0		0.9		NR	Δ(S-P) = 4.2°
11 Feb		iP	21 14 37.6	c 73	1.3			28.2 S 177.5 W, h about 41 km
		e	53.6		0.9			0 = 21 01 06.4 Kermadec
		e	17 46.3		1.5			Islands. Mag. = 6-3/4 (Pas)
		ePP	18 37.0		2.0			6-3/4 (Berk)
	N	eSKS	25 11.6		2.0			Strong surface waves on BB
	N	eSKKS	25 38.4		2.4			and LP
	N	eS	26 02.0		1.4			
	LPN	e(S)	26 23		30.0			
		ePKKP$_1$	31 17.5		1.0			
		ePKKP$_2$	46.2		1.0			
		eP'P'	39 27.6		1.2			
	LP	eSur	46 00				T	
11 Feb		eP	21 25 27.2	1	0.3			
	E	eS	50.0		0.6		NR	Δ(S-P) = 1.7°
11 Feb		eP	21 47 50.4	1	0.7		T	
11 Feb		eP	22 15 46.8	2	0.8			
		e	52.5		0.8		T	
11 Feb		eP	22 48 29.8	1	0.8			
		e	38.2		0.9		T	
11 Feb		iP	22 54 36.4	d 13	0.9			24.2 S 66.6 W, h about 176 km
		e	56 01.0		0.9		T	0 = 22 44 04.8 Salta Province,
								Argentina

DATE	Syst.	Phase	Arrival Time G.C.T.			Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h.	m.	s.					
11 Feb		eP	23	12	19.4	2	0.9			
		e			28.4		0.9		T	
12 Feb		eP	01	30	25.2	8	0.8		T	34.8 S 106.9 W, h about 100 km 0 = 01 19 21.8 Easter Island region
12 Feb		eP	01	58	35.7	5	1.1			
		e			45.3		1.2		T	
12 Feb		eP	03	44	02.9	1	0.5			
		e			22.2		1.1		T	
12 Feb		eP	03	53	31.3	2	0.6			31.0 N 109.1 W, h about 63 km
	IBE	e			59		1.2			0 = 03 51 14.6 Mexico-Arizona,
	BB	e		56	15		4.3			U.S.A. border
	LPE	e			26		13.0			
	BB	eSur		57	20		7.0		R	
12 Feb		eP	12	21	42.7	7	1.2			15.0 S 175.2 W, h about 281 km
		e		22	37.7		1.0			0 = 12 09 22.0 Samoa Islands
		e(pP)			51.5		1.1			region
	N	eS		32	05.5		2.1			
		ePKKP		39	31.3		0.7		T	
12 Feb		eP	13	09	48.6	4	0.7			13.1 S 171.8 E, h about 598 km
		ePP		13	54.7		1.5			0 = 12 57 15.3 New Hebrides
	N	eSKS		19	30.2		2.2			Islands region
		ePKKP		26	25.6		0.8		T	
12 Feb		eP	13	10	19.3	9	1.0			
		e(PKKP)		26	57.8		1.3		T	
12 Feb		eP	14	02	12.5	1	0.6			59.4 N 150.1 W, h about 79 km
		e			21.5		0.8		T	0 = 13 54 30.6 Kenai Peninsula, Alaska
12 Feb		eP'	15	40	11.7	3	1.3		T	4.1 S 127.3 E, h about 111 km 0 = 15 21 17.9 Banda Sea
12 Feb		eP	17	11	22.8	1	0.5			
	E	eSur		14	05.5		0.7		R	
12 Feb		eP	22	05	58.3	54	1.0			43.7 N 147.6 E, h about 45 km
	LPE	eS		16	05.0		26.0			0 = 21 53 43.5 Kurile Islands
	LPN	eSS		21	33.5		30.0			Mag. = 6-3/4 - 7 (Pas), 7 (Pal)
	IBE	eSS			44.5		9.0			Strong surface waves on all
		ePKKP		24	34.4		0.9			systems
	LPN	eSKKP		27	46		27.0			
		eP'P'		32	33.2		1.7			
	LP	eSur		33	37				T	

DATE	Syst.	Phase	Arrival Time G.C.T.			Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h.	m.	s.					
12 Feb		eP	22	17	22.9	2	0.8		T	
12 Feb		eP	23	03	45.3	4	1.3		T	43.7 N 148.0 E, h about 17 km
										0 = 22 51 27.7 Kurile Islands
12 Feb		eP	23	25	33.5	1	0.7		T	
12 Feb		eP	23	38	49.4	49	1.3			44.0 N 147.7 E, h about 23 km
		e		39	04.0		1.3			0 = 23 26 34.5 Kurile Islands
		ePKKP		57	25.8		0.8		T	
13 Feb		eP	01	59	13.3	1	0.8		T	
13 Feb		eP	02	43	31.4	2	0.7			43.5 N 148.1 E, h about 60 km
		e		48	45.0		3.2		T	0 = 02 31 19.4 Kurile Islands
13 Feb		eP	03	09	08.7	1	0.7		T	
13 Feb		eP	06	58	15.2	2	0.9			
		e(pP)			32.7		1.3			
		e			49.1		1.3			
		e		59	54.9		1.5			
	BBE	eS	07	08	54		8.3			17.0 S 173.7 W, h about 43 km
	BBE	eSS		15	09		6.5			0 = 06 45 25.0 Tonga Islands
	LPE	eSur		20	42					region. Mag. = 5-3/4 (Pas),
	LP	eSur		25	50				T	6 (Pal). Strong surface waves on LP and BB.
13 Feb		eP	08	31	16.7	1	0.7		T	
13 Feb		eP	09	19	13.2	5	1.0		T	43.8 N 147.0 E, h about 25 km
										0 = 09 06 55.9 Kurile Islands
13 Feb		eP	13	39	11.8	1	0.7		T	
13 Feb		eP	14	19	54.3	3	1.1		T	
13 Feb		eP'	16	29	02.5	1	0.7		T	29.7 N 81.0 E, h about 35 km
										0 = 16 10 19.8 Nepal - Tibet border
13 Feb		eP'	16	36	17.6	13	1.1			5.1 S 128.7 E, h about 66 km
		ePP		38	18.6		1.5			0 = 16 17 20.1 Banda Sea
		e		39	12.1		0.7		T	
13 Feb		iP	16	39	38.7	23	0.7			43.7 N 149.6 E, h about 25 km
		e(pP)			51.4		1.3			0 = 16 27 20.9 Kurile Islands
	BB	e(PP)		42	23		5.6			Mag. = 6 - 6-1/4 (Pas), 5-1/2 -
		e(PP)			45.5		1.7			5-3/4 (Pal)
	BB	e		48	24		6.0			
	BB	e(SKS)		50	03		7.5			
	LP	eSur	17	07	15				T	

DATE	Syst.	Phase	Arrival Time G.C.T.	Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h. m. s.					
13 Feb		eP	18 02 32.2	2	0.9		T	44.1 N 147.4 E, h about 42 km
								0 = 17 50 16.5 Kurile Islands
13 Feb		eP	18 06 44.4	2	0.2			
		eP	53.8		0.3			
	E	eS	07 06.2		0.3		NR	Δ(S-P) = 1.6°
13 Feb		eP	19 24 49.2	3	1.0		T	
13 Feb		eP	21 20 38.4	1	0.3			
	E	eS	21 04.9		0.5		NR	Δ(S-P) = 2°
13 Feb		eP	21 23 54.9	2	0.9			43.6 N 147.8 E, h about 51 km
		epP	24 08.9		1.1		T	0 = 21 11 40.9 Kurile Islands
13 Feb		eP	21 47 44.7	1	0.8		T	
13 Feb		eP	22 49 27.5	14	1.1		T	43.6 N 148.1 E, h about 40 km
								0 = 22 37 12.9 Kurile Islands
13 Feb		eP	23 33 18.2	9	0.3			
	E	eS	26.3	999			L	Δ(S-P) = 0.4°
13 Feb		eP	23 47 31.6	3	0.9		T	
14 Feb		eP	00 06 16.5	1	0.3			
	E	eS	31.3		0.4		L	Δ(S-P) = 1.0°
14 Feb		eP	00 11 27.4	2	0.5			
	E	eS	55.5		0.4		NR	Δ(S-P) = 2.2°
14 Feb		eP	00 27 50.6	13	1.2			43.7 N 147.5 E, h about 92 km
		e	28 06.5		0.9		T	0 = 00 15 40.6 Kurile Islands
14 Feb		eP	00 58 08.7	1	0.7		T	
14 Feb		eP	01 14 50.5	1	0.7			
		e	58.4		0.7		T	
14 Feb		eP	03 03 22.1	2	0.7		T	44.2 N 147.8 E, h about 98 km
								0 = 02 51 15.3 Kurile Islands
14 Feb		eP	03 27 43.0	1	0.5			
		e	28 35.4		0.9		T	43.8 N 147.4 E, h about 25 km
								0 = 03 15 25.0 Kurile Islands
14 Feb		iP	03 34 19.3	42	1.3			
		e	33.3		1.4			43.8 N 147.9 E, h about 20 km
	N	e	35 31.1		1.5			0 = 03 22 00.7 Kurile Islands
		e	36 25.2		1.5			Mag. = 6 - 6-1/4 (Pas)
	LPN	e	40 19		50.0			Strong surface waves on LP
	BBN	e	42 40		8.0			
	LP	eSKS	44 07		26.0			
	BB	ePPS	45 27		14.5			
	LPN	eSur	04 06 00				T	

DATE	Syst.	Phase	Arrival Time G.C.T.	Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h. m. s.					
14 Feb		eP	03 58 57.3	3	1.2			
		e	59 11.5		1.5		T	
14 Feb		eP	05 06 15.0	2	1.1		T	
14 Feb		eP	05 56 30.3	30	1.2			42.3 S 73.1 W, h about 58 km
		e	38.1		1.0			0 = 05 44 24.3 Near coast of
		ePP	59 44.0		1.2		T	southern Chile
14 Feb		eP	07 34 20.1	1	0.7			
		e	36.4		0.7			
	LPN	e	40 47		45.0		T	
14 Feb		eP	10 16 22.9	1	1.0		T	14.8 S 167.5 E, h about 190 km
								0 = 10 02 48.9 New Hebrides Islands
14 Feb		eP	11 48 46.0	2	0.7		T	
14 Feb		eP	15 52 51.2	1	0.9		T	
14 Feb		eP	16 03 48.6	4	0.9		T	15.4 S 175.1 W, h about 25 km
								0 = 15 50 52.2 Samoa Islands region
14 Feb		eP	17 22 15.0	1	0.9		T	
14 Feb		eP	19 21 58.5	1	0.7		T	
14 Feb		eP	21 21 38.2	999				
	N	eS	42.0	999			L	Δ(S-P) = 0.1°
14 Feb		eP	22 57 42.1	1	0.2			
	E	eS	58 03.7		0.5		NR	Δ(S-P) = 1.6°
14 Feb		eP	23 49 25.0	6	0.9		T	
15 Feb		eP	00 11 09.2	1	0.5			
		eS	36.7		0.5		NR	Δ(S-P) = 2.1°
15 Feb		eP	00 15 19.0	1	0.4			
		eS	40.0		0.4		NR	Δ(S-P) = 1.5°
15 Feb		eP	01 15 49.5	3	0.7			
	E	eSur	19 37.4		0.7		R	
15 Feb		eP	01 21 15.7	3	1.0			
		e	22 16.5		0.7		T	
15 Feb		eP	01 41 45.1	2	0.7			
		e	43 51.6		0.6		T	
15 Feb		eP	02 39 14.6	1	0.7		T	
15 Feb		eP	04 00 04.3	14	1.0			
		eSur	03 48.0		1.1		R	
15 Feb		eP	04 38 43.7	3	1.0		T	

DATE	Syst.	Phase	Arrival Time G.C.T.	Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h. m. s.					
15 Feb		eP	06 40 28.9	1	0.7			26.1 S 177.5 W, h about 148 km
		e(pP)	41 07.5		0.8		T	0 = 06 27 13.8 Southwest of Tonga Islands
15 Feb		eP	10 57 28.9	230	1.8			
		ePP	11 00 47.1		2.0			43.7 N 147.4 E, h about 69 km
	LP	eSKS	07 37		19.0			0 = 10 45 15.9 Kurile Islands
		e(SP)	08 24.6		1.4			Mag. = 6 - 6-1/4 (Pas), 6 (Pal)
	BBE	e	13 30.0		10.0			Strong surface waves on LP
		ePKKP	16 04.7		1.0			
		eP'P'	24 02.7		1.0			
	LP	eSur	25 35				T	
15 Feb		eP	11 36 37.9	1	1.0		T	
15 Feb		ePP	11 48 27.9	9	1.4			30.8 N 84.4 E, h about 66 km
		ePKKP	58 14.3	2	0.7		T	0 = 11 28 55.0 Tibet
15 Feb		eP	13 17 23.6	3	0.8		T	
15 Feb		eP	13 59 07.0	1	0.6		T	
15 Feb		eP	18 14 53.3	2	0.3			
	E	eS	15 14.6		0.5		NR	Δ(S-P) = 1.6°
15 Feb		eP	19 01 12.8	3	0.8		T	
15 Feb		eP	22 28 45.6	2	1.0		T	
16 Feb		eP	00 51 17.4	1	0.8		T	
16 Feb		eP	03 32 03.9	2	1.0			
		e	16.1		0.9		T	
16 Feb		eP	03 57 24.7	12	1.2		T	41.1 N 19.4 E, h about 143 km
								0 = 03 44 58.8 Near coast of Albania
16 Feb		eP	05 27 11.3	9	0.8	SW		
		e	32.2		0.8			
		e	37.5		1.1		T	
16 Feb		eP	09 07 50.4	1	0.6		T	32.7 N 137.7 E, h about 303 km
								0 = 08 54 59.9 South of Honshu Japan.
16 Feb		eP	13 39 15.1	5	0.7			
		e	22.8		1.2		T	
16 Feb		iP	14 07 06.2	c103	1.5			43.2 N 148.0 E, h about 71 km
		e	17.4		1.8		T	0 = 13 54 53.7 Kurile Islands
								Mag. = 6 - 6-1/4 (Pas)

DATE	Syst.	Phase	Arrival Time G.C.T.	Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h. m. s.					
16 Feb		eP	14 52 19.3	2	1.0			
		e	27.0		0.9		T	
16 Feb		eP	15 06 41.5	2	1.0			43.7 N 147.5 E, h about 25 km
		e	51.9		0.8		T	0 = 14 54 23.3 Kurile Islands
16 Feb		eP	16 08 42.8	1	0.8		T	
16 Feb		eP'	16 28 47.6	2	0.5		T	8.4 S 111.3 E, h about 189 km
								0 = 16 09 32.4 Java
16 Feb		eP	17 24 50.8	1	0.5			
	E	eSur	26 18.2		0.6		R	
16 Feb		eP	19 03 36.4	2	1.0		T	
16 Feb		eP	20 23 21.6	2	1.0		T	
16 Feb		eP	20 46 02.5	2	0.4			
		eS	54.6		0.6		NR	Δ(S-P) = 4.4°
16 Feb		eP'	20 49 16.0	4	1.2		T	33.7 S 57.8 E, h about 100 km
								0 = 20 29 21.4 Indian Ocean, south of Mascarene Islands
16 Feb		eP	21 06 21.3	4	1.0		T	
16 Feb		eP	21 14 32.0	1	0.2			
	E	eS	36.2	999			L	Δ(S-P) = 0.1°
16 Feb		eP	21 49 05.8	2	0.5			
	N	eSur	52.0		0.5		NR	
17 Feb		eP	00 35 24.7	4	1.0		T	18.9 S 173.7 W, h about 254 km
								0 = 00 22 51.7 Tonga Islands
17 Feb		eP	00 35 40.7	2	0.5			
	E	eS	36 13.3		0.6		NR	Δ(S-P) = 2.6°
17 Feb		eP	05 09 36.1	2	0.7			
		eSur	13 01.6		0.5		R	
17 Feb		e(P)	05 47 11.6	2	0.9		T	
17 Feb		eP	05 55 07.0	1	0.4			
	E	eSur	58 49.3		0.6		R	
17 Feb		iP	06 18 42.2	c 7	0.7			6.5 N 73.5 W, h about 25 km
		ePcP	21 04.1		0.5		T	0 = 06 11 35.7 Colombia
17 Feb		eP	08 31 20.2	2	1.0		T	
17 Feb		eP	13 57 36.3	3	1.1		T	
17 Feb		eP'	15 56 23.8	4	1.0			5.0 S 129.7 E, h about 254 km
		ePP	58 20.0		1.2		T	0 = 15 37 44.8 Banda Sea
17 Feb		eP	21 45 19.0	1	1.0		T	

DATE	Syst.	Phase	Arrival Time G.C.T.	Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h. m. s.					
18 Feb		eP	00 32 02.0	2	0.9		T	
18 Feb		eP	01 16 12.2	2	0.8			44.0 N 147.5 E, h about 28 km
		e	33.4		1.0		T	0 = 01 04 00.8 Kurile Islands
18 Feb		eP	01 29 13.2	2	1.0		T	
18 Feb		eP	08 25 15.4	2	1.0		T	
18 Feb		eP	08 34 43.3	3	1.0		T	
18 Feb		eP	12 35 34.5	2	0.8		T	
18 Feb		eP	15 23 10.8	4	1.0		T	
18 Feb		eP	16 06 17.9	2	1.1		T	43.6 N 148.2 E, h about 25 km
								0 = 15 54 01.6 Kurile Islands
18 Feb		eP	16 42 47.3	2	0.8		T	
18 Feb		eP	17 11 22.2	1	0.6		T	
18 Feb		eP	17 14 45.2	42	1.4			1.3 S 15.7 W, h about 25 km
		e	15 57.0		2.0			0 = 17 02 10.0 Atlantic Ocean;
	LP	eSur	43 25.0				T	north of Ascension Island
18 Feb		eP'	20 19 19.8	2	1.0			4.3 N 126.6 E, h about 74 km
		ePP	20 21.0		1.0		T	0 = 20 00 28.7 Off coast of
								Mindanao, Philippine Islands
18 Feb		eP	20 24 25.4	1	0.6		T	
18 Feb		eP	20 29 17.0	2	0.9		T	
18 Feb		eP	23 27 02.2	4	0.2			
	N	eS	10.6	999			L	Δ(S-P) = 0.4°
18 Feb		eP	23 30 38.8	1	0.4			
	E	eSur	32 14.0		0.6		R	
19 Feb		eP	01 21 32.2	1	0.7		T	
19 Feb		eP	03 33 33.8	5	1.1		T	
19 Feb		e(P)	07 04 39.5	2	1.1		T	
19 Feb		eP	07 25 54.9	1	0.9		T	
19 Feb		eP	08 03 22.0	4	0.8			56.1 N 153.4 W, h about 61 km
		e	06 10.8		0.9		T	0 = 07 55 27.6 Kodiak Island,
								Alaska
19 Feb		eP	12 19 12.7	2	0.8		T	56.1 N 153.5 W, h about 39 km
								0 = 12 11 15.7 Kodiak Island,
								Alaska
19 Feb		eP	12 23 33.9	2	0.8			
		e	25 50.5		1.3		T	

DATE	Syst.	Phase	Arrival Time G.C.T.	Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h. m. s.					
19 Feb		eP	12 46 49.6	7	1.3		T	14.1 S 13.9 W, h about 100 km
								0 = 12 33 41.9 South Atlantic
								Ocean
19 Feb		iP	13 15 41.9	7	0.9			56.1 N 153.4 W, h about 44 km
		ePcP	17 37.7		0.8		T	0 = 13 07 45.5 Kodiak Island,
								Alaska
19 Feb		eP	18 47 14.7	1	0.5			
		eSur	49 55.0		0.6		R	
19 Feb		eP	22 50 39.6	4	1.0		T	
20 Feb		eP	00 10 00.8	3	0.7			
	E	eSur	14 33.1		2.0		R	
20 Feb		eP	03 45 48.7	1	1.0		T	
20 Feb		eP	05 36 45.0	1	0.9			
	E	eSur	39 43.4		1.4		R	
20 Feb		eP	06 54 08.2	1	0.9		T	
20 Feb		eP	07 37 13.8	2	0.7		T	
20 Feb		iP	13 09 58.0	c 29	0.8	SE		
		e	10 16.6		0.9			
		e	12 51.5		1.1			
		e	13 07.4		0.9			
		e	15 04.4		1.0			
	BBE	e	20 43		5.0		T	
20 Feb		eP	13 36 15.8	1	0.6		T	
20 Feb		eP	14 01 12.4	1	0.2			
	E	eS	26.0		0.4		L	Δ(S-P) = 0.9°
20 Feb		eP	18 07 15.7	1	0.4			
	E	eS	56.2		0.5		NR	Δ(S-P) = 3.3°
20 Feb		eP	18 19 56.6	3	0.8			
		e	20 10.7		0.8			
		e	23 12.8		1.0		T	
20 Feb		iP	18 36 58.2	d 35	0.7	SSE		
		e(PcP)	37 16.9		0.9			
		e	27.6		0.9			
		e(PP)	39 33.1		1.0			
	E	eS	46 10.8		2.0			
	E	e(ScS)	47 04.2		2.0			
		eP'P'	19 04 38.6		1.0		T	Δ(P'P'-P) = 73°
20 Feb		eP	19 09 19.7	6	1.2		T	

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
20 Feb		eP	19	58	11.4	8	1.2		T	
20 Feb		eP	21	28	26.7	1	0.8		T	
20 Feb		eP	21	46	45.4	2	0.8		T	
20 Feb		eP	22	34	48.3	108	1.2			2.5 S 77.6 W, h about 50 km
		eScP		40	35.4		1.2			0 = 22 27 00.4 Equador
	BBE	eS		41	06		7.0			Weak surface waves on LP
	BBE	eSS		44	28		7.0		T	
21 Feb		eP	01	18	52.3	1	1.0		T	
21 Feb		eP	02	38	02.9	1	0.3			
	E	eS			17.4		0.4		L	Δ(S-P) = 1°
21 Feb		eP	03	14	56.8	2	0.8			36.5 N 23.3 E, h about 49 km
		e(pP)		15	13.8		0.7		T	0 = 03 01 55.3 Near south coast
21 Feb		eP	04	05	21.7	1	0.9		T	of Greece
21 Feb		eP	05	29	24.7	1	0.6		T	
21 Feb		eP	15	27	41.6	1	0.7		T	
21 Feb		eP	19	26	55.5	2	0.8		T	
21 Feb		eP'1	19	30	54.4	4	1.0			48.8 S 106.2 E, h about 52 km
		e		31	18.2		0.8			0 = 19 10 56.8 Indian Ocean,
		eP'2			23.1		0.8		T	about 1000 miles southwest of
21 Feb		eP	21	22	21.0	3	1.0			Australia
		e		25	10.4		0.8		T	
21 Feb		eP	22	22	02.4	3	0.9			
		e			18.8		0.9		T	
21 Feb		eP	22	37	59.3	1	0.3			
	E	eS		38	21.0		0.5		NR	Δ(S-P) = 1.6°
21 Feb		eP'	23	47	24.0	6	1.0		T	0.1 S 123.2 E, h about 183 km
										0 = 23 28 34.9 Celebes
22 Feb		eP	02	59	09.0	2	0.7		T	51.5 N 179.8 E, h about 99 km
										0 = 02 49 18.2 Andreanof Islands
										Aleutian Islands
22 Feb		eP	07	47	43.6	1	0.4			
		eSur		51	12.5		1.5		R	
22 Feb		eP	08	27	50.0	1	0.5			
		eSur		29	24.7		0.7		R	

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
22 Feb		eP	08	50	10.9	1	0.5			
	E	eSur		51	40.0		0.7		R	
22 Feb		eP	09	27	29.8	2	0.9		T	
22 Feb		eP'	16	02	18.1	2	0.8			0 99.1 E, h about 36 km
		ePP		05	23.7		1.3		T	0 = 15 42 51.9 Near coast
										of Sumatra
22 Feb		eP	16	09	14.8	1	0.3			
	E	eSur			40.3		0.6		NR	Δ(S-P) = 1.9°
22 Feb		eP	18	43	03.2	1	0.6			
		e		44	32.2		0.7		R	
22 Feb		eP	19	44	31.7	1	0.9		T	
22 Feb		eP	22	07	02.1	5	0.8			28.4 S 177.2 W, h about 78 km
		epP			18.2		1.1			0 = 21 53 34.5 Kermadec
		e(PP)		11	11.7		1.7			Islands region.
	BBE	eSKS		17	38		8.0			Mag. = 5-3/4 (Berk) 5-1/2 -
	N	eSKKS			57.0		2.2			5-3/4 (Pal)
		ePKKP		23	32.6		0.7			Medium surface waves on LP
	LPN	eSur		39	00				T	
22 Feb		eP	23	01	13.8	1	0.4			
	E	eS			36.7		0.5		NR	Δ(S-P) = 1.7°
23 Feb		eP	00	59	37.5	2	0.9		T	
23 Feb		eP	01	46	28.7	1	0.9		T	
23 Feb		eP	01	54	11.4	3	1.1		T	
23 Feb		eP	03	16	05.8	1	0.5			
	E	eSur		20	10.0		0.9		R	
23 Feb		eP	03	17	29.8	3	1.1		T	
23 Feb		eP	03	36	36.5	1	0.8		T	35.0 N 27.3 E, h about 16 km
										0 = 03 23 16.0 Dodecanese
										Islands region
23 Feb		eP	04	19	22.8	2	1.2		T	
23 Feb		eP	04	29	05.0	8	1.0			38.2 N 142.7 E, h about 119 km
		ePP		32	26.0		2.0			0 = 04 16 25.0 Off east coast
	BBE	eS		39	45		7.0			of Honshu, Japan
	LPN	e(SS)		44	50		22.0			Weak surface waves on LP
	LPN	eSur		55	40					and BB
	LPN	eSur	05	00	25				T	
23 Feb		eP	08	01	15.1	2	0.9		T	

DATE	Syst.	Phase	Arrival Time G.C.T.	Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h. m. s.					
23 Feb		eP	14 36 25.4	5	0.8			
	E	eSur	40 10.5		0.9		R	
23 Feb		iP'	17 32 01.8	999				
		iS	04.6		0.5		L	Δ(S-P) = 0.1°
23 Feb		eP	17 46 20.8	5	1.2		T	
23 Feb		eP	19 54 18.7	2	0.8		T	
23 Feb		eP	21 44 50.8	1	0.9		T	
23 Feb		eP	21 58 12.5	1	0.8		T	
23 Feb		eP	21 59 00.8	3	1.0			37.3 N 27.5 E, h about 25 km
		e	47.1		1.0		T	0 = 21 45 51.5 Dodecanese Islands
23 Feb		eP	22 12 25.4	2	1.0		T	
23 Feb		eP	22 36 29.7	2	0.8		T	
23 Feb		eP	23 22 18.0	15	0.2			
	E	eS	26.5	999			L	Δ(S-P) = 0.4°
24 Feb		eP	02 50 00.7	2	0.8		T	
24 Feb		eP	03 18 28.6	1	0.8			26.1 N 125.4 E, h about 25 km
		ePP	22 52.7		1.6		T	0 = 03 04 11.7 Ryukyu Islands
24 Feb		eP	08 26 04.1	7	0.9		T	17.8 S 68.5 W, h about 100 km
								0 = 08 16 05.4 Western Bolivia
24 Feb		eP	12 04 06.7	3	0.7		T	
24 Feb		eP	13 51 23.2	1	0.6		T	
24 Feb		eP	15 19 15.6	1	0.9		T	
24 Feb		eP	18 19 55.6	3	0.6			
		e	20 15.0		0.7		T	
25 Feb		eP	02 15 39.6	4	1.0		T	
25 Feb		eP	05 07 48.3	3	0.8			21.7 S 179.6 W, h about 608 km
		epP	10 00.0		0.9			0 = 04 55 25.1 Fiji Islands
		ePP	11 47.2		1.4		T	region
25 Feb		eP	05 49 29.3	2	0.8		T	
25 Feb		eP	08 37 05.1	2	0.7			23.4 S 179.9 W, h about 576 km
		epP	39 22.5		0.9			0 = 08 24 33.2 South of Fiji
		ePP	41 12.2		1.2		T	Islands region
25 Feb		eP	11 29 56.8	6	1.2			
		e	35 18.8		0.8		T	

DATE	Syst.	Phase	Arrival Time G.C.T.	Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h. m. s.					
25 Feb		eP	15 14 53.0	11	1.0		T	15.4 S 175.8 W, h about 62 km
								0 = 15 02 04.8 Samoa Islands region
25 Feb		eP	15 36 07.9	3	0.9		T	
25 Feb		eP	16 46 12.6	4	0.6	SE		
		e	20.7		0.8			
		e	40.2		0.7		T	
25 Feb		eP	18 50 03.5	1	0.4			
	N	eS	56.6		0.6		NR	Δ(S-P) = 4.4°
25 Feb		eP	20 29 58.1	4	0.9		T	
26 Feb		eP	00 59 06.1	2	0.9		T	
26 Feb		eP	01 15 16.4	1	0.7		T	
26 Feb		eP	02 48 03.1	2	0.8		T	
26 Feb		eP	05 59 46.7	95	1.6			32.7 S 111.2 W, h about 29 km
		ePcP	06 00 13.4		1.0			0 = 05 48 46.3 Easter Island
		e	51.4		2.0			region. Mag. = 6-1/2 - 6-3/4
	IB	ePP	02 13		2.5			(Pas), 6 (Berk), 5-1/2 -
	LPN	eS	08 37		27.0			5-3/4 (Pal)
	BBE	e(S)	55		10.0			Strong surface waves on LP
	BB	e(PS)	09 13		7.0			and BB
	LPN	eSS	13 20		23.0			
	LP	eSur	15 30					
	LPN	eSur	22 35					
		eP'P'	28 00.8		1.4		T	
26 Feb		eP	06 47 06.0	4	1.0		T	
26 Feb		eP	18 02 05.2	1	0.7		T	
26 Feb		iP	18 24 27.4	150	2.0			31.4 N 131.2 E, h about 54 km
	LP	e(P)	31		18.0			0 = 18 10 48.7 Near coast of
		epP	38.4		1.9			Kyushu, Japan. Mag.= 7 - 7-1/4
	BB	e	27 51		6.0			(Pas), 7 (Berk), 7-1/4 (Pal)
	BB	ePP	28 31		14.0			Very strong surface waves on
	LP	ePPP	30 40		18.0			all systems
	LP	eSKS	34 36		18.0			
	LP	eSKKS	35 15		25.0			
		eS	35		2.5			
	LP	eS	50		22.0			
	LPN	e(PS)	37 08	999				
		$ePKKP_1$	40 56.3		0.6			
		$ePKKP_2$	41 21.6		0.7			

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
	LP	eSS		42	26	999				(continuation from preceding page)
	LP	e		47	00	999				
		eP'P'		49	01.4		1.3			
	N	e		52	02.6		2.0			
	LP	eSur		49	35					
		eSur		55	20.0					
		eSur	19	13	00.0				T	
26 Feb		ePP	21	20	02.8	3	1.0		T	16.0 N 121.6 E, h about 32 km
										0 = 21 01 04.8 Luzon,
										Philippine Islands
27 Feb		eP	00	09	28.6	1	0.5			
	N	eS		10	14.2		0.5		NR	Δ(S-P) = 3.7°
27 Feb		iP	01	14	41.2	d 73	0.8			6.7 N 73.0 W, h about 200 km
		e		15	32.8		0.8			0 = 01 07 51.3 Colombia
		ePcP		17	03.9		0.8			
	N	eS		20	10.7		1.5			
		eScP			34.7		0.9			
		ePcS		21	47.5		1.1			
	N	eScS		24	42.1		1.2		T	
27 Feb		eP	03	17	50.3	5	1.0		T	
27 Feb		eP	03	36	49.0	5	0.9			
		e		38	24.2		0.8			
		e		40	43.8		0.5		T	
27 Feb		eP	09	08	22.1	2	1.0		T	
27 Feb		eP	09	15	37.0	2	0.8			
	LPE	eSur		19	25					
	BBE	eSur			35					
	BB	e		34	20.0		5.0		R	
27 Feb		eP	10	41	36.7	14	1.2			38.7 S 72.4 W, h about 57 km
		epP			45.7		1.8			0 = 10 29 48.3 Southern Chile
		e(PP)		44	49.9		1.4			
	LP	e(PPP)	11	09	55.0		25.0		T	
27 Feb		eP	11	43	04.0	22	1.5			
		e			12.8		1.4		T	
27 Feb		eP	12	09	38.6	6	1.2		T	
27 Feb		eP	13	15	39.4	37	1.5			52.5 N 168.8 W, h about 56 km
		e			50.6		1.1			0 = 13 06 35.8 Fox Islands,
		e		16	43.3		1.6		T	Aleutian Islands

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
27 Feb		eP	15	50	07.4	6	0.8			9.8 N 84.4 W, h about 97 km
		e(pP)			26.4		0.7			0 = 15 44 19.8 Near coast
		ePcP		53	20.8		1.0			of Costa Rica
	LP	eSur	16	00	35.0				T	
27 Feb		eP	21	53	12.6	4	0.8		T	
27 Feb		eP	22	26	17.5	1	0.4			
		eP			26.0		0.6			
	E	eS		27	13.1		0.5		NR	Δ(S-P) = 4.7°
28 Feb		eP	01	37	59.2	2	1.1		T	
28 Feb		eP	04	04	54.9	1	0.8		T	
28 Feb		eP	05	16	55.0	1	0.7		T	
28 Feb		eP	11	49	36.0	6	0.9		T	
28 Feb		iP	12	45	25.1	4	0.7			46.5 N 152.2 E, h about 29 km
		e			40.1		0.8		T	0 = 12 33 32.1 Kurile Islands
28 Feb		eP	18	06	45.5	2	0.4			
	E	eS		07	14.0		0.6		NR	Δ(S-P) = 2.2°
28 Feb		eP	18	11	24.1	1	0.4			
	E	eS			44.8		0.5		NR	Δ(S-P) = 1.5°
28 Feb		eP	18	33	34.6	6	0.7	SE		
		e		34	12.5		0.6			
	E	eSur		37	12.2		0.6		R	
28 Feb		eP	20	12	05.6	1	0.6		T	
28 Feb		iP	21	28	57.8	22	1.0			24.1 S 66.6 W, h about 30 km
		ePcP		29	30.5		1.2			0 = 21 18 11.3 Salta Province,
		ePP		31	21.7		1.0			Argentina
	N	eScS		38	45.0		2.0		T	
28 Feb		eP	21	39	14.7	2	0.2			
	E	eS			35.7		0.6		NR	Δ(S-P) = 1.5°

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WICHITA MOUNTAINS SEISMOLOGICAL OBSERVATORY
FORT SILL, OKLAHOMA, U. S. A.

Operated under the Technical Supervision of the
Air Force Technical Applications Center (AFTAC)

By
The Geotechnical Corporation, Garland, Texas

B. B. Leichliter, Chief Seismologist

REPORT ON THE REGISTRATION OF EARTHQUAKES FOR MARCH 1961

Volume 1, No. 3

By Robert C. Shopland, Project Engineer;

Seismograms read by Gayle Stanfill and Cecil Morgan

Advanced Research Projects Agency (ARPA)
DEPARTMENT OF DEFENSE,
UNITED STATES GOVERNMENT

THE REGISTRATION OF EARTHQUAKES

AT THE

WICHITA MOUNTAINS SEISMOLOGICAL OBSERVATORY

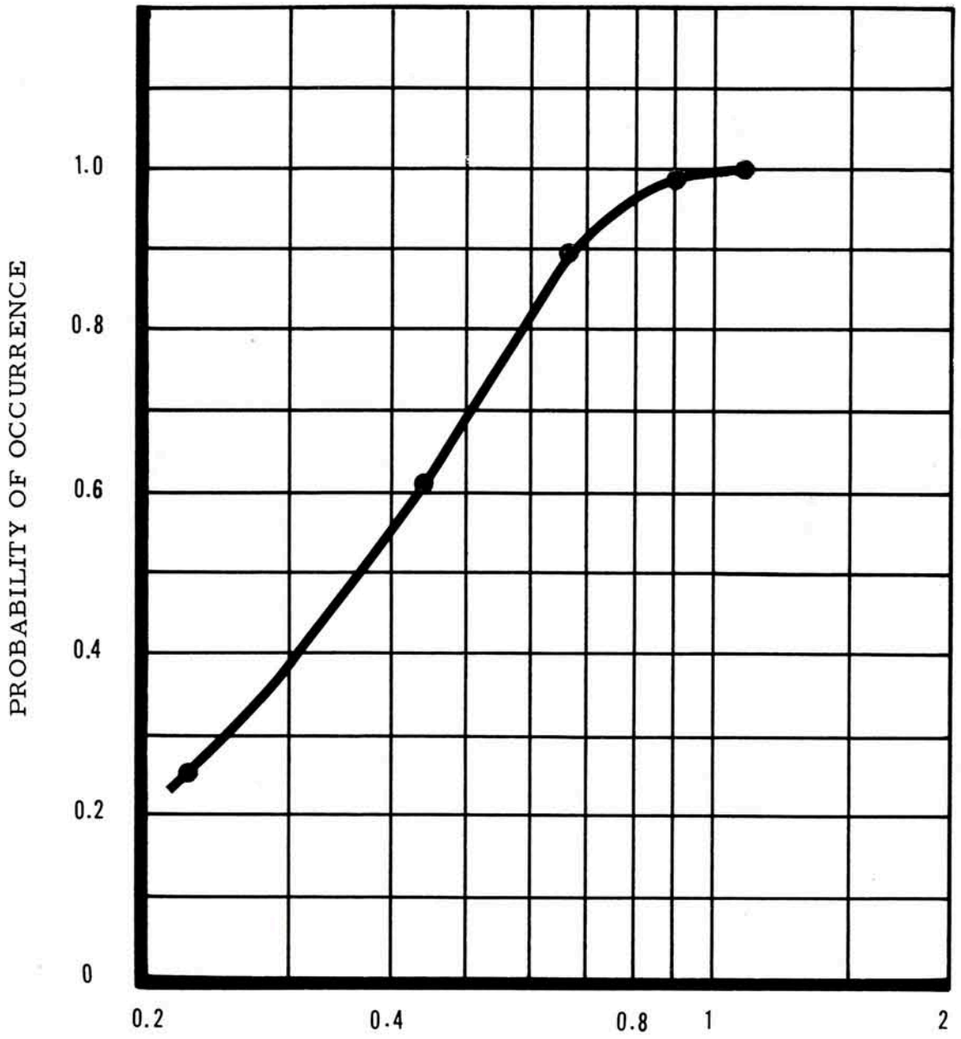
STATION

Station Abbreviation: WMSO
Station Identification on Film Seismograms: a
Geographical Location*: 34° 43' 05.3" N. Lat.
(Vault No. 6) 98° 35' 20.7" W. Long.

GEOCENTRIC LOCATION*: 34° 32' 09.8" N. Lat.
(Vault No. 6) 98° 35' 20.7" W. Long.

ALTITUDE (Meters)*: 505 Meters (1658 feet)
(Vault No. 6)

GEOLOGY: The station is located on the Carlton (porphyritic) granophyre of the Wichita Mountains of Oklahoma.



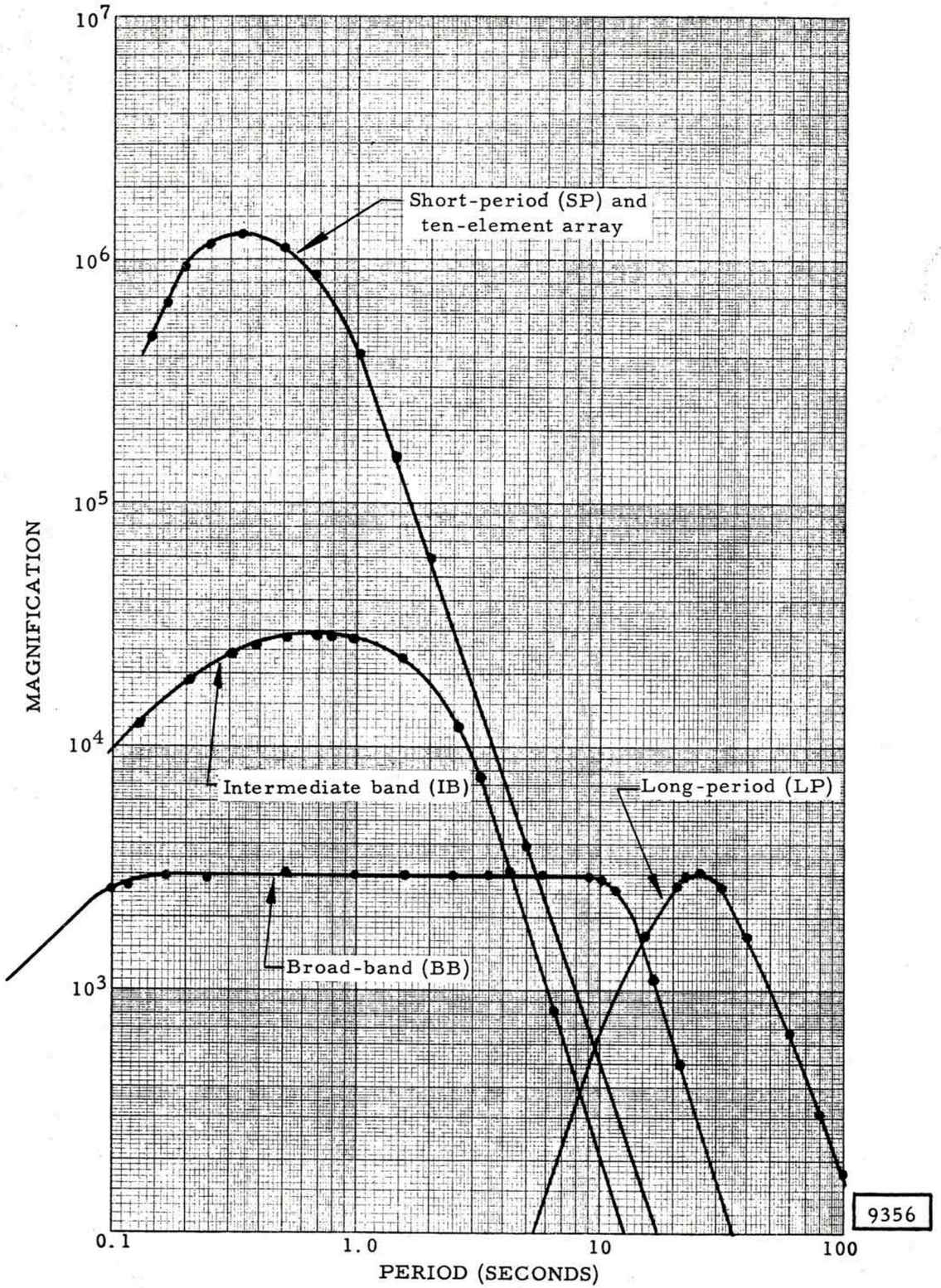
Probability of predominant 0.5-sec microseisms occurring at or less than a given amplitude at Unity magnification

SEISMOGRAPHS

	Ts	λs	Tg	λg	σ^2
SP Vertical Benioff	1.0	1.0	0.2	1.0	0.01
SP Horizontal Benioff	1.0	1.0	0.2	1.0	0.01
IB Vertical Melton	2.5	0.65	0.64	1.5	0.002
IB Horizontal Sprengnether	2.5	0.65	0.64	1.5	0.0005
BB Vertical Press-Ewing	12.5	0.4	0.64	9.0	0.0002
BB Horizontal Sprengnether	12.5	0.4	0.64	9.0	0.0004
LP Vertical Sprengnether	25.0	1.0	30	1.0	0.004
LP Horizontal Sprengnether	25.0	1.0	30	1.0	0.004

SP = Short Period
IB = Intermediate Band
BB = Broad Band
LP = Long Period
Ts = Free Period of seismometer in secs.
λs = Damping constant of seismometer
Tg = Free Period of Galvanometer in secs.
λg = Damping constant of Galvanometer
σ^2 = Coupling Coefficient

NOTE: Response curves may be found on page 4.



Response characteristics of seismographs

INTERPRETATION OF SYMBOLS

1. Earthquakes Listed

All local (L), near-regional (NR), regional (R), and distant earthquakes (T) are tabulated on the following pages.

2. System

In the column headed "Syst." (system), the seismograph (SP, IB, BB, or LP) and component (Z, N, or E) used to measure arrival time are designated. When no component designation appears, the phase is read from the vertical component. When neither system nor component designation appears, the phase is read from the SP vertical component.

3. Phase

(1) "i" (impetus) preceding a phase designates sudden beginning of the motion. (A designation of "i" in the case of initial P motion indicates a signal-to-noise ratio exceeding about 5/1).

(2) "e" (emersio) designates gradual beginning.

(3) "i" or "e" alone designates an unidentified phase.

(4) ( ) (parenthesis marks) indicate uncertainty.

4. Time

(1) Date and arrival time are given in Greenwich Civil Time (G. C. T.).

(2) The arrival time is reported as the earliest time on Z, N, or E. Single Z rather than the array summation ($\sum$) is used for measuring arrival times on the SP seismographs.

5. Ground Motion

(1) In the columns headed "A" and "T" are tabulated earth displacement in millimicrons and period in seconds, respectively. An amplitude of 999 indicates that a signal cannot be measured reliably. A "c" or "d" in the "A" column indicates compression or dilation, respectively, of the ground as indicated by the vertical component instrument.

The value of "A" for P phases is the maximum amplitude in the first ten seconds. All amplitudes are center-to-peak amplitudes.

(2) Trace amplitudes are measured to the nearest 1/2 millimeter at X10 view.

6. Direction

In the column headed "Dir." (direction), the direction of the epicenter as viewed from WMSO is indicated. For teleseisms, direction is obtained only from P and Rayleigh waves and is listed opposite the phase from which it is obtained. For close events, direction may be obtained from P-wave step-out shown on the individual short-period vertical traces.

7. Type

Earthquakes are identified as either:

L	(local) - - - - - - - - - -	0° -	1.4°
NR	(near-regional) - - - - -	1.4° -	6°
R	(regional) - - - - - - - -	6° -	16°
T	(teleseismic) - - - - - -	16° -	180°

8. Remarks Column

(1) Epicentral locations, time of origins, depth of focii, and magnitudes are obtained from the U.S. Coast and Geodetic Survey Preliminary Determination of Epicenters cards.

(2) The nature of the surface waves is indicated subjectively.

(3) Epicentral locations and distances reported by the station are accompanied by an indication of the phases used to determine epicentral distance, e.g. Δ (S-P) = 6°, Central Colorado.

(4) Operational notes refer to operational difficulties that affect analysis of data.

DATE	Syst.	Phase	Arrival Time G.C.T.	Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961								
01 Mar		eP	02 58 56.1	4	1.1		T	
01 Mar		eP	03 35 10.3	4	0.7			30.7 S 66.0 W, h about 259 km
		e	52.7		0.8			0 = 03 24 10.4 La Rioja
		epP	36 11.0		1.0		T	Province, Argentina
01 Mar		eP	03 46 20.4	2	1.0		T	
01 Mar		eP	04 51 45.8	1	0.7			
		e	52 08.5		0.6		T	
01 Mar		eP	06 54 01.7	5	0.8		T	18.7 S 177.9 W, h about 513 km
								0 = 06 41 43.5 Fiji Islands region
01 Mar		eP	12 05 54.2	2	0.6			
		e	06 09.3		0.8			
		eSur	09 49.0		0.8		R	
01 Mar		eP	13 06 35.6	4	0.8			
		e	45.9		0.6		T	
01 Mar		eP'	13 33 07.4	3	0.7			8.0 S 107.4 E, h about 33 km
			52.0		0.8		T	0 = 13 13 41.4 Near coast of Java
01 Mar		eP'	14 06 46.1	3	1.0		T	7.5 S 130.0 E, h about 25 km
								0 = 13 47 37.2 Banda Sea
01 Mar		eP	14 24 10.8	1	0.6			2.8 N 126.5 E, h about 61 km
		e	20.5		1.0			0 = 14 05 08.3 Molucca
		e	25 00.9		1.1			Passage
		ePP	46.9		1.6			
		eSKP	27 37.7		1.3		T	
01 Mar		eP	18 01 06.6	2	0.5			
	E	Sur	02 02.0		0.6		R	
01 Mar		eP	18 14 21.3	5	0.2			Δ(S-P) = 0.4°
	E	eS	29.8		0.4		L	
01 Mar		eP	18 35 13.3	1	0.3			
	E	eS	34.8		0.5		NR	Δ(S-P) = 1.6°
01 Mar		eP	18 38 11.7	1	0.7			
	N	eSur	40 10.0		0.7		R	
01 Mar		eP	19 38 53.0	3	0.8			
		e	39 56.6		0.8		T	
01 Mar		eP	20 38 19.5	1	0.5			
	N	eSur	30 45.0		1.0		R	

DATE	Syst.	Phase	Arrival Time G.C.T.			Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h.	m.	s.					
01 Mar		eP	22	38	11.0	1	0.5			
		e			36.5		0.6			
	N	eSur		42	26.0		0.6		R	
01 Mar		eP	23	50	00.7	3	0.8			2.8 S 105.7 W, h about 59 km
		ePP		51	25.7		1.3			0 = 23 42 43.8 About 1500 km
		ePcP		52	14.7		0.9			west of Galapagos Islands
	N	e(PcS)		55	47.2		3.5		T	
02 Mar		eP	00	07	17.5	2	0.7		T	
02 Mar		eP	00	08	38.5	10	0.8			15.7 N 92.2 W, h about 98 km
	N	eSur		12	21.5	999			T	0 = 00 04 12.7 Mexico -
										Guatemala Border
02 Mar		eP	00	59	00.5	2	0.8		T	
02 Mar		eP	01	29	35.1	5	0.7			
		e			54.8		0.5		T	
02 Mar		eP	04	49	08.0	2	0.9		T	
02 Mar		eP	05	04	44.8	1	0.7		T	
02 Mar		eP	05	10	52.4	2	0.7		T	
02 Mar		eP	13	56	43.3	2	1.0			
		e			57.4		0.7		T	
02 Mar		eP	15	26	29.9	26	1.3			4.7 S 106.3 W, h about 25 km
		e		27	00.0		1.0			0 = 15 18 54.3 Pacific Ocean
	BBE	e(S)		32	43		10.0			west of Galapagos Islands.
	LPE	e		35	49		22.0			Medium surface waves on all
	BBE	e		38	22		8.0			systems.
	BB	eSur		39	22		8.0			
	SP	eSur		39	23		6.0			
	LP	e		40	53		24.0		T	
02 Mar		eP	17	53	44.3		0.8			
		e		54	04.2		0.8			
		e			36.1		0.7		T	
02 Mar		eP	19	19	43.4	3	0.4			Δ(S-P) = 1.4°
		eS		20	02.5	999			L	
02 Mar		eP	20	50	29.3	3	0.7			
		e		51	33.8		0.8		T	
02 Mar		eP	22	47	11.0	2	0.4			
		eS			32.4	999			NR	Δ(S-P) = 1.6°
03 Mar		eP	02	20	01.8	2	0.6		T	

DATE	Syst.	Phase	Arrival Time G.C.T.			Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h.	m.	s.					
03 Mar		eP	03	04	11.0	2	1.6			
		e			24.8		1.6			
	LP	e			37.0		18.0		T	
03 Mar		eP	05	28	24.5	1	0.8		T	42.3 N 143.9 E, h about 60 km
										0 = 05 15 55.8 Hokkaido, Japan
03 Mar		eP	06	55	36.6	2	1.0			
	LPN	eSur	07	15	40		25.0		T	
03 Mar		eP	08	49	36.5	1	0.6			
	LP	eSur	09	05	27		15.0		T	
03 Mar		eP	18	37	27.4	5	1.0		T	
03 Mar		eP	20	35	25.3	9	0.9		T	
03 Mar		eP	21	55	30.5	1	0.8		T	
03 Mar		eP	23	00	42.8	1	0.4			
	E	eSur		01	27.9		0.6		NR	
03 Mar		eP	23	03	26.4	60	1.2		T	44.1 S 74.8 W, h about 95 km
										0 = 22 51 15.6 Near coast of
										southern Chile
04 Mar		eP	00	06	43.4	2	1.0			37.2 S 71.9 W, h about 25 km
		e		07	25.0		1.0		T	0 = 23 54 55.6 Central Chile
04 Mar		eP	00	14	18.7	1	0.4			
	E	eS			39.8		0.4		NR	Δ(S-P) = 1.6°
04 Mar		eP	07	52	05.0	1	0.6		T	
04 Mar		eP	08	16	33.6	10	1.0	SW	T	
04 Mar		eP	10	29	46.3	10	1.0			20.4 S 67.6 W, h about 109 km
		epP		30	14.1		1.0			0 = 10 19 33.7 Near Chile -
		ePcP			27.1		1.0			Bolivia border
		e		32	35.7		1.2		T	
04 Mar		eP	10	46	46.5	1	0.6		T	
04 Mar		eP	12	11	25.2	4	1.0		T	
04 Mar		eP	18	57	23.4	4	1.0		T	
04 Mar		eP	19	08	51.9	8	1.2			51.8 N 167.3 W, h about 99 km
		ePcP		10	03.8		0.8		T	0 = 18 59 58.2 Fox Islands,
										Aleutian Islands
04 Mar		eP	21	14	19.8	27	0.5			12.6 N 88.0 W, h about 85 km
		e			34.0		0.8			0 = 21 09 09.9 Near coast of
	N	eS		18	33.4		1.8		T	El Salvador
04 Mar		eP	21	21	36.0	3	0.8		T	

DATE	Syst.	Phase	Arrival Time G.C.T.	Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h. m. s.					
04 Mar		eP	22 35 58.3	2	0.3			△(S-P) = 1.6°
	E	eS	36 20.0		0.3		NR	
04 Mar		eP	22 38 51.8	8	0.9			37.8 N 141.6 E, h about 61 km
		e	39 00.3		1.0		T	0 = 22 26 01.2 Near coast of Honshu, Japan
04 Mar		eP	23 58 37.3	1	0.4			
		eSur	59 07.0		0.4		NR	
05 Mar		eP	01 40 22.3	7	1.4			10.7 S 161.6 E, h about 99 km
		e	38.1		0.7			0 = 01 26 26.1 Solomon Islands
		ePP	44 27.1		1.6			region. Mag. = 6-1/4 (Pas)
		ePKKP	56 30.8		1.3			Strong surface waves on LP
	LP	eSur	02 15 06				T	and BB
05 Mar		eP'	02 21 31.1	4	1.2		T	7.9 S 115.0 E, h about 76 km
								0 = 02 02 08.0 Near coast of Java
05 Mar		eP	02 56 35.8	2	0.9		T	
05 Mar		eP	05 58 54.2	3	1.0		T	
05 Mar		eP	13 12 33.0	3	1.0		T	
05 Mar		eP	15 40 48.9	2	0.8		T	
05 Mar		eP	21 39 00.5	12	0.8			20.6 S 176.1 W, h about 58 km
		e	43.0		1.4		T	0 = 21 25 55.6 Tonga Islands region
06 Mar		eP	07 08 54.6	5	0.7		T	
06 Mar		eP	08 33 30.6	3	1.0		T	
06 Mar		eP	12 17 53.5	2	0.7			48.1 N 80.0 W, h about 49 km
	E	eSur	23 33.0		0.9		T	0 = 12 13 31.0 Ontario Province Canada
06 Mar		eP	12 42 45.2	2	0.3			
	E	eS	43 06.8		0.5		NR	△(S-P) = 1.6°
06 Mar		eP	17 25 13.7	5	0.2			
	E	eS	22.7		0.5		L	△(S-P) = 0.4°
07 Mar		eP	00 48 49.6	1	0.5			
	N	eS	49 20.8		0.5		NR	△(S-P) = 2.5°

DATE	Syst.	Phase	Arrival Time G.C.T.	Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h. m. s.					
07 Mar		eP	04 29 48.5	1	1.0			28.0 N 142.8 E, h about 123 km
		epP	30 24.2		0.8		T	0 = 04 16 44.1 Bonin Islands region
07 Mar		eP	04 40 35.7	1	1.0		T	
07 Mar		eP	05 57 50.4	2	0.9		T	
07 Mar		eP	06 33 55.2	1	1.0		T	
07 Mar		eP	06 55 13.8	29	1.2			43.3 S 80.4 W, h about 60 km
		ePP	58 24.4		1.4			0 = 06 43 10.6 Off coast of
	LPN	eS	07 05 30		25.0			Chile. BB north and east
	LPN	eSS	10 40		30.0			inoperative. Medium surface
	LP	eSur	17 35				T	waves on LP.
07 Mar		eP	10 24 03.5	136	1.5			28.2 S 175.7 W, h about 43 km
	BB	iP	05	d	7.0			0 = 10 10 38.9 Kermadec
	LP	eP	07		23.0			Islands region. Mag. = 7-1/4 -
		e	25 29.8		1.0			7-1/2 (Pas) (Berk). 7 - 7-1/2
	LP	e	35		18.0			(Pal). BBE inoperative. Very
	BB	ePP	27 57		8.0			strong surface waves on all
	LP	ePP	28 02		25.0			systems
	BB	e	32 46		10.0			
	LPE	eSKS	34 35	999				
		eSKS	40.5		3.6			
		e(SKKS)	35 22.8		1.8			
	LP	eS	30.5	999				
	LP	eSP	36 46	999				
		e	38 46		40.0			
		$ePKKP_1$	40 55.9		1.0			
	LP	$ePKKP_2$	41 24.2		1.4			
	LP	eSS	42 02	999				
	LPE	eSKKS	47 42		25.0			
	LP	eSur	49 08					
		eP'P'	13.7		1.4			
		eSur	52 10					
	LP	eSur	53 54					
		eP'P'P'	11 09 57.2		1.7		T	
07 Mar		eP	10 59 25.7	1	1.2		T	
07 Mar		eP	17 30 14.6	2	0.8		T	
07 Mar		eP	18 13 19.4	17	0.9			
		e	50.0		0.9		T	

DATE	Syst.	Phase	Arrival Time G.C.T.	Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h. m. s.					
07 Mar		eP'_1	19 28 50.1	6	1.0			38.2 S 78.1 E, h about 30 km
		e	54.8		1.6			0 = 19 08 36.1 Indian Ocean.
		$e(P'_2)$	30 24.0		2.5			Mag. = 6 (Pas) BBN S & E-W
		ePP'	34 16.2		3.8			inoperative. Medium surface
		$ePcPP'$	37 39.0		2.4			waves on LP and BB
	LP	eSur	20 32 58				T	
07 Mar		eP	20 15 19.0	5	1.0		T	
08 Mar		eP	00 26 45.8	33	1.3			52.2 N 165.2 W, h about 63 km
		ePcP	28 06.0		0.7		T	0 = 00 17 58.4 Fox Islands,
								Aleutian Islands
08 Mar		eP	03 56 13.0	2	0.7		T	
08 Mar		eP	11 30 25.2	2	1.0		T	
08 Mar		eP	11 59 03.6	4	1.2		T	
08 Mar		eP	13 04 18.5	39	1.2		T	40.0 S 74.3 W, h about 96 km
								0 = 12 52 28.8 Near coast of
								Chile
08 Mar		eP	13 34 22.0	3	0.8			
		e	29.5		1.0		T	
08 Mar		eP	21 55 48.4	2	0.8		T	
08 Mar		eP	22 58 20.6	1	0.3			
	E	eS	41.1		0.5		NR	$\triangle$(S-P) = 1.5°
09 Mar		eP	00 50 06.2	5	0.2			
	E	eS	29.9		0.4		NR	$\triangle$(S-P) = 1.8°
09 Mar		eP	04 08 52.8	26	1.0			10.9 N 41.7 W, h about 27 km
		e	09 03.0		1.0			0 = 03 59 08.7 Atlantic Ocean.
		ePP	11 07.0		2.5			Medium surface waves on BB
	E	eS	16 30.8		4.6			and LP
	LPE	ePS	56.0		22.0			
	LPN	eSS	20 42.0		20.0			
	LPN	eSur	22 45.0					
	LP	eSur	26 57.0				T	
09 Mar		eP	04 35 47.0	4	1.2			
		e	39 09.1		1.4		T	
09 Mar		eP	08 25 21.3		1.0		T	
09 Mar		$e(P'_1)$	08 36 41.4	3	1.1			
		$e(P'_2)$	47.9		1.0			
		e	38 40.6		1.6		T	$[\triangle(P'_2 - P'_1) = 148°]$

DATE	Syst.	Phase	Arrival Time G.C.T.	Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h. m. s.					
09 Mar		eP	09 22 46.0	3	1.0		T	
09 Mar		eP	09 46 27.0	5	1.2		T	
09 Mar		eP	11 45 01.2	2	0.8		T	12.4 S 73.8 W, h about 25 km
								0 = 11 35 46.8 Peru
09 Mar		eP	12 59 32.0	3	1.0		T	
		eP	14 19 35.8	4	0.6	SE		
		e	40.0		0.5			
		e	20 24.6		1.0			
		e	22 06.8		0.6			
		e	24 02.8		2.0		T	
09 Mar		eP	14 46 59.1	4	1.0		T	
09 Mar		eP	15 03 40.0	2	0.6		T	
09 Mar		eP	15 38 08.8	1	0.6		T	
09 Mar		eP	18 01 37.6	1	0.2			
	E	eS	59.2		0.4		NR	$\triangle$(S P) = 1.6°
09 Mar		eP	18 16 24.4	6	1.2		T	
09 Mar		eP	20 55 42.6	2	0.4			
	E	eS	56 18.0		0.4		NR	$\triangle$(S-P) = 2.8°
09 Mar		eP	21 55 25.4	2	0.8			
		e	57 33.3		0.8		T	
09 Mar		eP	22 47 41.0	1	0.2			
	E	eSur	48 17.0		0.3		NR	
09 Mar		eP	22 51 08.1	1	0.5			
	E	eSur	42.8		0.6		NR	
09 Mar		eP	22 53 24.0	1	0.7		T	
10 Mar		eP	02 01 06.4	2	0.8			
		e	02 01.6		1.2			
		e	05 55.0		1.2		T	
10 Mar		eP'	03 19 38.1	1	0.9		T	51.9 S 161.6 E, h about 25 km
								0 = 03 00 43.3 Macquarie
								Island region
10 Mar		eP	03 47 21.0	4	0.8		T	
10 Mar		eP	15 12 20.5	5	1.1			BB, LP and IB inoperative.
		e	26.8		1.0			
		e	14 22.2		1.1			
		e	17 36.0		1.2		T	

DATE	Syst.	Phase	Arrival Time G.C.T.	Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h. m. s.					
10 Mar		eP	15 42 15.2	3	0.8			23.5 S 65.4 W, h about 118 km
		e	46.8		1.0		T	0 = 15 31 37.2 Jujuy Province, Argentina
10 Mar		eP	16 17 16.8	1	0.4			
	E	eS	43.3		0.6		NR	△(S-P) = 2.0°
10 Mar		eP	18 28 18.9	5	0.9			
		e	27.3		0.9		T	
10 Mar		eP	19 56 40.0	4	0.7		T	
10 Mar		eP	20 48 27.0	2	0.6			
		e	33.3		0.7		T	
10 Mar		eP	21 31 44.2	2	0.8		T	
10 Mar		eP	22 37 15.1	2	0.8		T	
10 Mar		iP	23 18 09.6	36	1.1			10.1 N 83.6 W, h about 56 km
		e	17.5		1.1			0 = 23 12 20.4 Near coast of
		e	51.2		1.0			Costa Rica
		ePP	19 03.7		1.3			
		e	14.8		0.9			
	LPE	eScS	29 10		14.0		T	
10 Mar		eP	23 23 51.7	4	0.9	SW		
		e	55.0		1.0		T	
10 Mar		eP	23 58 49.3	2	0.5			
		eP̄	59 19.3		0.4			
	E	eS	40.2		0.5		NR	△(S-P) = 4.2°
11 Mar		eP	00 06 08.6	2	0.9		T	
11 Mar		eP	00 35 40.5	1	0.8		T	
11 Mar		eP	01 35 54.9	2	0.8		T	52.9 N 167.3 W, h about 98 km
								0 = 01 27 02.3 Fox Islands, Aleutian Islands
11 Mar		iP	01 43 12.9	c 31	1.0			48.7 N 154.6 E, h about 26 km
		e(PcP)	24.2		1.0			0 = 01 31 34.4 Kurile Islands
	BB	e	30		6.0			Mag. = 6-1/2 (Berk)
		e	40.2		2.0			Strong surface waves on LP
	IBE	eS	52 44		5.0			and BB
	BBE	eS	46		8.0			
	LPE	eSS	57 40		28.0			
	LP	e	02 02 00		27.0			
	LP	eSur	10 00				T	

DATE	Syst.	Phase	Arrival Time G.C.T.	Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h. m. s.					
11 Mar		eP	02 38 04.1	5	0.9			16.3 S 173.0 W, h about 25 km
		e	26.0		0.9		T	0 = 02 25 17.0 Tonga Islands region
11 Mar		eP	03 38 09.3	1	0.8		T	
11 Mar		eP	05 20 33.3	4	1.0		T	
11 Mar		eP	07 27 49.5	1	0.7			52.8 N 168.6 W, h about 40 km
		ePcP	29 05.7		0.8		T	0 = 07 18 44.9 Fox Islands, Aleutian Islands
11 Mar		eP'	09 00 00.6	3	0.8			11.2 N 43.3 E, h about 18 km
		ePP	01 29.7		1.7		T	0 = 08 41 00.0 Near coast of British Somaliland
11 Mar		eP	12 20 52.9	2	0.9		T	
11 Mar		eP	14 44 35.5	2	1.1			
		e	45 20.7		1.5		T	
11 Mar		eP	19 08 55.3	2	0.9		T	
11 Mar		eP	19 24 15.8	1	0.9		T	
11 Mar		eP	20 22 58.0	2	0.4			
	E	eS	23 19.0		0.5		NR	△(S-P) = 1.5°
11 Mar		eP	22 14 11.2	3	1.0		T	
11 Mar		eP	23 31 25.3	1	0.2			
	N	e(S)	32 21.8		0.3		NR	△(S-P) = 4.7°
12 Mar		eP	01 35 16.6	3	0.7			
		e	41.5		0.8		T	
12 Mar		eP	02 19 24.0	2	0.8		T	
12 Mar		eP	02 53 50.5	49	1.2			17.4 N 107.3 W, h about 57 km
		e	54 12.0		1.8			0 = 02 49 33.4 Off coast of
		e	39.0		1.4			Mexico. Mag. = 5-1/4 - 4-1/2
	LPE	eS	57 15.0		20.0			(Berk). Strong surface waves
	BBE	eSur	59 04.0					on all systems
	BB	e	03 03 45.0		7.0		T	
12 Mar		eP	03 14 45.1	2	0.8		T	
12 Mar		eP	03 45 08.4	5	1.1		T	
12 Mar		eP	04 53 51.6	2	1.1		T	
12 Mar		eP	05 54 50.7	3	1.0		T	
12 Mar		eP	08 27 24.4	1	0.6		T	
12 Mar		eP	09 08 28.9	3	1.0		T	

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
12 Mar		eP	10	43	17.0	3	1.0		T	
12 Mar		eP	12	13	08.8	10	0.9			19.2 N 107.1 W, h about 64 km
		e			20.7		1.1			0 = 12 09 10.7 Off west coast
	LPE	eSur		18	25.0					of Mexico. Weak surface waves
	BBE	eSur			35.0				T	on BB and LP
12 Mar		eP	15	04	45.0	15	0.9		T	43.8 N 129.1 W, h about 19 km
										0 = 14 59 16.8 Off coast of
										Oregon.
12 Mar		eP	15	48	18.5	5	0.8			
		e		53	42.6		1.2		T	
12 Mar		eP	15	54	26.3	3	0.6			Weak surface on LP and BB
	LPE	eSur		58	57					
	BBE	eSur		59	17				R	
12 Mar		eP	19	19	35.2	6	1.2		T	
12 Mar		eP	23	35	02.4	22	1.5			28.4 S 176.0 W, h about 113 km
		e			15.0		0.6			0 = 23 21 42.5 Tonga Islands
		e			45.7		1.4			region. Mag. = 6-1/4 - 6-1/2
		ePP		39	01.5		1.6			(Berk). Strong surface waves
		ePKKP		51	50.6		0.8			on LP and BB
13 Mar	LPE	e	00	03	37		22.0			
	LP	e(Sur)		10	15					
	LP	eSur		12	50					
	LP	eSur		20	57				T	
12 Mar		eP	23	55	06.3	2	0.7		T	
13 Mar		eP	03	31	48.8	3	1.0			
		e		32	07.3		1.2		T	
13 Mar		eP	07	43	42.7	2	0.8			
		e		44	11.2		0.9		T	
13 Mar		eP	08	07	42.8	175	1.4			19.2 N 107.3 W, h about 49 km
	BB	eP			44		7.0			0 = 08 03 43.9 Off west coast
	LP	eP			47		15.0			of Mexico. Mag. = 6-1/4 -
	BB	e		08	32		8.0			6-1/2 (Pas)
	LPE	e		11	05		20.0			Strong surface waves on all
		eSur		12	48	999				systems
	LP	eSur		13	05				T	

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
13 Mar		eP	09	17	57.4	2	0.8		T	
13 Mar		eP	15	45	06.0	1	0.7		T	35.8 N 26.6 E, h about 25 km
										0 = 15 31 56.0 Dodecanese
										Islands
13 Mar		eP	18	02	09.4	2	0.2			
		eS			31.4	999			NR	△(S-P) = 1.6°
13 Mar		iP	18	06	38.9	c 999				
		eS			41.5	999			L	△(S-P) = 0.1°
13 Mar		eP	18	17	52.4	2	0.4			
	E	eS		18	13.5	999			NR	△(S-P) = 1.5°
13 Mar		eP	19	30	34.6	4	1.1			34.4 N 26.5 E, h about 25 km
		e		31	44.6		1.0			0 = 19 17 16.1 Crete
		ePP		34	34.5		1.3		T	
13 Mar		eP	20	46	57.0	5	1.1		T	
13 Mar		eP	20	54	01.6	4	1.0			
		e			16.4		1.0		T	
13 Mar		eP	21	05	01.3	4	0.9		T	
13 Mar		eP	21	28	24.7	5	1.1		T	16.9 S 178.1 W, h about 600 km
										0 = 21 16 13.1 Fiji Islands
										region
14 Mar		eP	01	08	40.0	2	0.2			
		ePcorr			49.1		0.3			
	E	eS		09	01.4		0.5		NR	△(S-P) = 1.5°
14 Mar		eP	01	17	35.1	7	0.9			42.9 N 140.2 E, h about 147 km
		e			40.0		1.0		T	0 = 01 05 06.2 Off west coast of
										Hokkaido, Japan
14 Mar		eP	01	24	55.4	2	1.0			16.9 S 176.5 W, h about 60 km
		e		26	13.0		1.0			0 = 01 11 55.4 Tonga Islands
	LP	eSur		56	10.0		20		T	region. Weak surface waves
										on LP
14 Mar		eP	04	30	59.5	7	0.8			18.8 S 172.6 W, h about 25 km
		e		31	10.3		0.8		T	0 = 04 18 06.5 Tonga Islands
										region
14 Mar		eP	07	05	15.2	5	1.0			
		e			28.0		1.4		T	
14 Mar		eP	07	38	13.0	1	1.0		T	

DATE	Syst.	Phase	Arrival Time G.C.T.	Ground Motion A	T	Dir.	Type	Remarks
1961			h. m. s.					
14 Mar		eP	12 07 39.4	2	0.8			67.8 N 164.9 W, h about 78 km
		e	08 15.1		1.2			0 = 11 58 53.9 Bering Strait
		ePcP	09 02.4		1.0		T	
14 Mar		eP	22 55 04.3	2	0.2			
	E	eS	26.0		0.5		NR	△(S-P) = 1.6°
15 Mar		eP	00 35 32.0	1	0.3			
	E	eS	53.0		0.5		NR	△(S-P) = 1.5°
15 Mar		eP	00 36 55.8	2	0.7		T	
15 Mar		eP	00 57 31.1	44	1.5	SE	T	
15 Mar		e	10 29 23.3		1.4			3.3 S 150.7 E, h about 21 km
		e	33 03.1		1.2			0 = 10 14 55.5 New Ireland
		ePP	52.0		2.0			region. Mag. = 6 (Pas)
	BB	eSKS	40 30		9.0			First phase is probably P
	LPN	e	41 40		17.0			diffracted. Strong surface
		ePKKP	44 47.7		1.2			waves on LP and BB.
	LPN	eSS	49 04		25.0			
	LPN	e	53 00		28.0			
	LPN	eSur	11 01 40					
	LP	eSur	05 45				T	
15 Mar		eP	13 15 17.7	1	1.0			diffracted P
		eP'	13 19 23.5	2	0.8			4.4 S 152.5 E, h about 99 km
		e	20 41.1		1.1			0 = 13 01 02.2 New Britain
	LP	eSur	13 51 50.				T	Weak surface waves on LP
15 Mar		eP	14 02 01.7	2	0.8		T	
15 Mar		eP	18 20 02.2	1	0.6			
		eSur	22 18.5		0.9		R	
15 Mar		eP	19 10 43.1	1	0.3			
	E	eS	11 16.4		0.4		NR	△(S-P) = 2.6°
15 Mar		eP	21 06 29.3		0.4			
		eSur	07 21.5		0.5		NR	
15 Mar		eP	22 10 03.8	3	0.9		T	
16 Mar		eP	00 29 12.1	1	0.7		T	
16 Mar		eP	04 24 06.8	9	1.4		T	
16 Mar		eP	04 43 20.4	5	0.8			24.9 S 179.9 E, h about 536 km
		epP	45 14.6		1.0			0 = 04 30 39.9 Kermadec
		ePP	47 24.7		1.0		T	Islands region

DATE	Syst.	Phase	Arrival Time G.C.T.	Ground Motion A	T	Dir.	Type	Remarks
1961			h. m. s.					
16 Mar		eP	05 08 13.4	3	0.9			51.7 N 176.1 E, h about 39 km
		ePcP	51.5		0.8			0 = 04 58 00.4 Rat Islands,
		e	09 24.3		0.9			Aleutian Islands
	LPN	e	27 34		30.0		T	
16 Mar		eP	07 31 47.4	1	0.7		T	
16 Mar		eP'	07 35 02.9	2	0.6			6.6 S 106.5 E, h about 135 km
		e	36 10.4		0.8		T	0 = 07 15 41.7 Soenda Strait
16 Mar		eP	07 58 43.6	5	0.7		T	
16 Mar		eP	08 05 32.6	9	0.8		T	19.0 S 172.7 W, h about 25 km
								0 = 07 52 39.6 Tonga Islands
16 Mar		eP	09 55 04.4	2	0.8		T	
16 Mar		eP'	11 38 42.7	22	1.3			6.4 S 130.7 E, h about 77 km
		e	39 14.2		1.0			0 = 11 19 43.5 Banda Sea
		ePP	40 41.0		1.3			
		e	41 01.5		1.3			
		e	42 42.5		1.2		T	
16 Mar		eP'	14 04 42.1	1	0.7			8.2 S 122.0 E, h about 74 km
		e	52.6		1.2			0 = 13 45 35.6 Flores Island.
		ePP	07 24.0		1.9			Mag. = 6-1/4 (Pas) 6-1/4 -
		eSKP	08 22.2		1.8			6-1/2 (Pal)
	LP	ePPP	10 04		18.0			Strong surface waves on LP
	LP	e	11 00		23.0			and BB
		e(PKKP)	14 30.8		0.9			PKKP possible new event
		e(SKSP)	17 04.5		1.6			
	LPN	eSS	25 22		27.0			
	LPN	e	29 25		25.0			
	LP	e	31 40		30.0			
	LPN	eSur	40 45					
	LP	eSur	54 50				T	
16 Mar		eP	14 59 11.9	24	0.3	SE		
	N	eS	36.4		0.4		NR	△(S-P) = 1.9°
16 Mar		eP	15 38 31.7	11	0.8			49.6 N 154.3 E, h about 42 km
		e(PcP)	41.1		0.8			0 = 15 26 56.2 Kurile Islands
		e	56.8		0.7		T	
16 Mar		eP	17 48 46.6	4	0.6	NE	T	

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
16 Mar		eP'	18	40	20.3	2	1.2			8.1 S 122.0 E, h about 43 km
		ePP		43	07.1		2.0			0 = 18 21 12.2 Flores Island
		eSKP			56.4		1.6			BB and LP inoperative
		e(SKSP)		52	54.0		1.8		T	
16 Mar		eP	19	35	31.4	6	0.9		T	
16 Mar		eP	20	18	35.1	3	0.8			23.6 S 176.0 W, h about 101 km
		e			47.8		1.2		T	0 = 20 05 27.2 Tonga Islands region
16 Mar		eP	22	39	38.1	3	1.1		T	
16 Mar		eP	22	46	32.8	6	0.9			
		e			45.1		1.0		T	
16 Mar		eP	22	50	16.1	4	0.9		T	
16 Mar		eP	23	18	22.4	1	0.2			
	E	eS			30.9	999			L	△(S-P) = 0.4°
16 Mar		eP	23	26	01.0	3	0.8			23.6 S 175.5 W, h about 20 km
		e			13.5		1.1		T	0 = 23 12 43.5 Tonga Islands region
16 Mar		eP	23	40	07.5	13	1.0			10.5 S 74.9 W, h about 201 km
		ePcP		41	24.8		0.6		T	0 = 23 31 27.2 Central Peru
17 Mar		eP	03	49	06.5	1	0.7			
		e			37.4		1.1		T	
17 Mar		eP'	05	10	21.6	2	1.2		T	8.3 S 122.1 E, h about 93 km
										0 = 04 51 10.4 Flores Island
17 Mar		eP	09	02	18.6	2	1.0		T	
17 Mar		eP	10	15	14.6	2	0.8			11.0 S 78.8 W, h about 60 km
		ePcP		16	36.7		0.7			0 = 10 06 28.1 Near coast of
		e			48.3		0.6		T	Peru
17 Mar		eP	10	29	11.7	3	1.0		T	36.9 S 74.8 W, h about 70 km
										0 = 10 17 35.4 Off coast of central Chile
17 Mar		eP	12	42	17.9	1	0.7		T	
17 Mar		eP	14	10	46.9	2	0.7			23.7 S 176.0 W, h about 49 km
		e		11	29.5		1.1		T	0 = 13 57 32.5 Tonga Islands region.

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
17 Mar		eP	14	19	58.2	12	1.1			23.8 S 175.9 W, h about 120 km
		e		20	13.4		0.9			0 = 14 06 51.6 Tonga Island
		e			44.5		0.9			region. Medium surface waves
	LP	eSur		51	00				T	on LP and BB
17 Mar		eP	16	30	13.9	6	0.8			
		e			27.1		0.9		T	
17 Mar		eP	17	24	48.3	5	0.6			
		e		26	43.0		0.6		T	
17 Mar		eP	17	50	35.9	5	1.0			
		e			48.6		1.0		T	
17 Mar		eP	18	25	08.9	2	0.8			
		e			34.4		1.0		T	
17 Mar		eP	20	23	49.0	22	1.0			24.3 S 175.6 W, h about 79 km
		e		24	16.4		1.0			0 = 20 10 36.4 Tonga Islands
		e			37.9		0.9			region. Mag. = 6 (Pas). LP
	BBE	eSKKS		34	23		9.0			inoperative 2031Z - 2040Z.
	BBE	e		35	02		11.0			Medium surface waves on LP
	LPN	eSS	20	41	22		27.0			and BB
	LPE	eSur		51	10					
	LP	eSur		54	40				T	
17 Mar		eP	22	34	09.0	4	0.8			
		e			21.4		1.1		T	
17 Mar		eP	22	53	19.6	2	0.8		T	34.1 N 141.0 E, h about 120 km
										0 = 22 40 21.5 Off south coast of Honshu, Japan
18 Mar		eP	02	04	57.3	4	0.8			
		e		05	09.6		0.8		T	
18 Mar		eP'	02	27	56.9	2	0.9			8.2 S 122.0 E, h about 35 km
		ePP		30	37.6		1.8			0 = 02 08 38.5 Flores Island
		eSKP		31	23.4		1.0			Weak surface waves on LP
	LP	eSur	03	05	00				T	
18 Mar		eP	06	04	11.8	5	1.0			
		e			41.7		0.8		T	
18 Mar		eP	08	05	54.2	1	0.7		T	
18 Mar		eP	08	38	43.9	2	0.4			Possible 2 events
		e			47.5		0.4			
	E	eS		39	12.8	999			NR	△(S-P) = 2.2°

DATE	Syst.	Phase	Arrival Time G.C.T.	Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h. m. s.					
18 Mar	LP	eSur	09 12 00					24.3 S 174.2 W, h about 25 km
	LP	eSur	16 17				T	0 = 08 26 49.0 Tonga Islands region
18 Mar		eP	09 53 40.6	1	0.8		T	28.9 S 178.4 W, h about 385 km
								0 = 09 40 47.6 Kermadec Islands region
18 Mar		eP	11 50 27.6	1	0.8			17.1 S 170.5 W, h about 78 km
		e	34.9		1.0		T	0 = 11 37 53.1 Tonga Islands region
18 Mar		eP	12 06 56.6	2	0.9		T	
18 Mar		eP	12 12 25.4	3	1.0			
		e	52.0		1.2		T	
18 Mar		eP	13 29 00.8	1	0.6			16.8 S 174.2 W, h about 25 km
		e	15.0		0.8		T	0 = 13 16 09.2 Tonga Islands region
18 Mar		eP	14 06 41.1	2	0.5			30.5 S 71.1 W, h about 53 km
		ePcP	07 06.5		0.5		T	0 = 13 55 34.7 Near coast of central Chile
18 Mar		eP'	15 13 51.0	12	1.2			49.9 S 163.3 E, h about 38 km
		e	14 14.0		1.8			0 = 14 54 59.3 South of New
	LP	ePP	15 30		19.0			Zealand. Mag. = 6-3/4 - 7 (Pas),
	LP	eSKS	21 00		15.0			6-1/2 - 6-3/4 (Berk), 6-1/2 (Pal)
	LPN	eSKKS	22 35		20.0			Strong surface waves on all
	LP	e	23 32		20.0			systems
		ePKKP	56.0		1.3			
	LP	eSP	25 28		20.0			
	LPE	eSS	31 55		25.0			
	LPE	e	35 15		21.0			
	LPN	e	39 38		32.0			
	LPE	eSur	45 30					
	LPE	eSur	52 00				T	
18 Mar		eP	15 17 57.0	3	0.7			
		e	18 31.5		0.9			
		e	19 25.5		0.7		T	

DATE	Syst.	Phase	Arrival Time G.C.T.	Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h. m. s.					
18 Mar		eP	15 26 52.0	5	1.0			
		e	27 08.8		1.0			
		e	28 35.1		2.2		T	
18 Mar		eP	15 31 30.5	10	1.2			
		e	39.2		1.0			
		e	51.4		1.1			
		e	36 28.4		3.6		T	
18 Mar	LP	eSur	17 03 35				T	Strong surface waves on LP and BB
18 Mar		eP'	17 58 23.2	3	1.0			7.6 N 126.9 E, h about 63 km
		ePKKP	18 08 32.7		0.5		T	0 = 17 39 34.3 Off east coast of Mindanao, P.I.
18 Mar		eP	23 25 36.9	1	1.0			
	LP	eSur	54 00			SW	T	Medium surface waves on LP
19 Mar		eP	00 19 24.0	11	1.0			
		e	35.0		1.0			
		e	44.1		1.7			
		e	53.0		1.4		T	
19 Mar		eP	02 48 47.2	2	0.9		T	
19 Mar		eP	05 04 33.8	2	0.6			40.5 N 142.9 E, h about 14 km
		e	05 41.8		1.0		T	0 = 04 51 52.2 North of Honshu, Japan
19 Mar		eP'	05 18 44.7	22	0.7			6.4 S 105.5 E, h about 120 km
		ePP	21 57.6		1.0			0 = 04 59 19.3 Soenda Strait.
	LP	eSur	06 09 18				T	Weak surface waves on LP
19 Mar		eP	05 46 46.0	2	0.8		T	
19 Mar		eP	07 01 52.2	3	1.0		T	
19 Mar		eP	07 27 45.7	7	0.9			
		e	58.0		1.0			Medium surface waves on LP and BB. Surface may be separate
		e	32 25.0		1.7			
		e	33 15.8		1.6			
	LP	eSur	08 00 00				T	
19 Mar		eP	07 42 41.1	2	0.8		T	
19 Mar		eP'	08 10 27.0	6	1.2			2.3 N 127.4 E, h about 83 km
		e	42.6		1.2			0 = 07 51 35.0 Molucca Passage
		ePP	12 07.1		1.5			
		eSKP	13 48.0		1.5			
		ePKKP	20 26.7		0.9			
		ePcPPKP	24 04.3		1.0		T	

DATE	Syst.	Phase	Arrival Time G.C.T.	Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h. m. s.					
19 Mar		eP	09 31 44.1	1	0.6			37.2 N 140.7 E, h about 115 km
		e	56.2		0.8			0 = 09 18 53.4 Honshu, Japan
		e	32 38.1		1.0		T	
19 Mar		eP	10 24 49.8	10	1.2		T	36.7 S 76.2 W, h about 100 km
								0 = 10 13 19.3 Off coast of central Chile
19 Mar		eP	11 17 17.0	3	0.7		T	
19 Mar		eP	12 35 58.0	2	0.9		T	Weak surface waves on LP.
	LP	eSur	54 20					Surface may be separate
19 Mar		eP'	13 06 28.8	1	0.7			8.1 S 121.9 E, h about 25 km
		eSKP	10 04.5		1.0			0 = 12 47 17.5 Flores Island
		e	55.2		1.1		T	
19 Mar		eP	14 27 02.0	19	0.8	SE		
		e	21.1		0.7			
		e	31.4		0.6			
		e	29 24.2		0.8			
		eSur	30 49.3		1.0			
		e	34 37.2		0.6		R	
19 Mar		eP	19 02 12.3	1	0.5			
		e	19.3		0.6			
		e	27.4		0.6			
		e	35.8		0.8			
		e	46.2		0.7			
	N	eSur	05 23.4		0.6		R	
19 Mar		eP	20 01 46.5	2	0.7		T	
19 Mar		eP	20 47 11.3	3	0.7			24.1 S 176.1 W, h about 39 km
		e	51.6		0.8		T	0 = 20 33 55.7 Tonga Island region
19 Mar	LP	eSur	21 40 00				T	Weak surface on LP
20 Mar		eP	00 38 32.3	2	0.9			
		e	39 10.0		0.8		T	
20 Mar		eP	01 26 52.6	2	1.0		T	
20 Mar		eP	03 44 43.0	2	0.9		T	
20 Mar		eP	03 48 47.8	2	0.6			
		e	49 35.6		1.0		T	

DATE	Syst.	Phase	Arrival Time G.C.T.	Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h. m. s.					
20 Mar		eP	03 53 36.8	1	0.8		T	
20 Mar		iP	06 21 47.1	999				11.5 N 86.3 W, h about 122 km
	LP	eP	50		17.0			0 = 06 16 23.9 Off west coast of
		ePcP	25 17.1		0.8			Nicaragua. Mag. = 6 - 6-1/4
	E	eS	26 23.8		2.0			(Pas). Strong surface waves on
	N	e	48.6		2.6			all systems.
	LPE	e	51		20.0			
	LP	eSur	29 28					
	N	eScS	32 46.7		1.2			
	BBE	e	59		8.0			
	BBE	e	34 22		9.0		T	
20 Mar		eP	06 46 26.8	1	0.7		T	
20 Mar		eP	06 53 52.0	3	0.6			
		e	54 43.4		1.2		T	
20 Mar		eP	07 03 48.0	11	0.7	SE		
		e	55.0		0.9		T	
20 Mar		eP	07 32 14.4	1	0.8		T	
20 Mar		eP	07 35 31.8	1	0.7		T	
20 Mar		eP	08 31 07.0	2	0.7		T	
20 Mar		eP	08 44 02.0	4	0.6	SE	T	
20 Mar		eP	08 52 47.4	2	0.7		T	
20 Mar		eP	09 36 52.2	2	0.6		T	
20 Mar		eP	10 52 35.6	4	0.2			
	E	eS	53 08.7		0.4		NR	$\triangle$(S-P) = 2.6°
20 Mar		iP	11 50 26.0	c 999			T	46.3 N 142.7 E, h about 354 km
								0 = 11 38 39.3 Sakhalin Island
20 Mar		eP	16 05 54.0	999				
	BB	e	06 39		11.0			18.4 S 175.2 W, h about 175 km
	LP	e	43		20.0			0 = 15 53 09.9 Tonga Islands.
		e	44.5		1.5			Mag. = 6-1/2 - 6-3/4 (Pas)(Berk).
	BB	e(PP)	09 28		4.0			Strong surface waves on LP
	LP	e	10 11		22.0			and BB.
	LP	e	15 10		20.0			
	BBE	eSKS	16 09		16.0			
	LPN	eSKS	12		19.0			
	BBE	eS	33	999				

(continued on next page)

DATE	Syst.	Phase	Arrival Time G.C.T.			Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h.	m.	s.					
	BBE	e		17	14		10.0			(continued from preceding page)
	LP	eSP			38		28.0			
	LPN	eSS		22	15		27.0			
		ePKKP		23	28.6		0.8			
	LPE	e		29	20		30.0			
	LPE	eSur		30	40					
		eP'P'		31	33.2		1.2			
	LPE	e			35		34.0			
	LP	eSKKKS		34	45		22.0			
	LP	e		35	32		25.0			
	LP	eSur		37	07				T	
20 Mar		eP	16	22	20.5	7	1.5		T	
20 Mar		eP	16	24	13.6	25	1.4			
		e			25.0		1.2			
		e		25	01.4		1.0		T	
20 Mar		eP	18	03	39.0	2	0.2			
	E	eS		04	00.8		0.3		NR	$\triangle$(S-P) = 1.6°
20 Mar		eP	23	02	43.4	2	0.2			
	E	eS		03	05.0		0.4		NR	$\triangle$(S-P) = 1.6°
20 Mar		eP	23	55	50.6	55	0.9			24.2 S 175.9 W, h about 25 km
	LP	e		56	15		19.0			0 = 23 42 33.9 Tonga Islands
	LP	e		57	25		18.0			region. Mag. = 6-1/4 (Pas)
										6-1/2 (Pal). Strong surface on
21 Mar	BBE	eSKS	00	06	26		11.0			BB and LP
	LPN	eSKS			30		20.0			
	LPE	eS		07	02		18.0			
	LPE	ePS		08	10		26.0			
	BBN	e		09	57		10.0			
		ePKKP		12	53.5		1.2			
	LPN	eSS		13	22		29.0			
	BBE	e		14	03		6.0			
	LP	e		15	00		20.0			
	LPN	e		16	45		35.0			
	LPN	e		20	25		25.0			
	LPE	eSur		21	51					
	LPE	e		22	35		25.0			
	LP	eSur		26	20					
	BB	eSur		29	05				T	

DATE	Syst.	Phase	Arrival Time G.C.T.			Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h.	m.	s.					
20 Mar		eP	23	58	55.2	4	0.7			
21 Mar		e	00	00	03.8		0.8		T	
21 Mar		eP	00	59	11.1	1	0.6			
		e	01	03	25.6		0.6		T	
21 Mar		eP	01	47	25.8	1	0.8		T	
21 Mar		eP	02	51	15.8	3	0.6			
	E	eSur		53	00.0		0.6		R	
21 Mar		eP	03	54	41.2	1	0.7		T	
21 Mar		eP	04	44	20.0	1	0.5			21.7 S 67.4 W, h about 25 km
		e			49.0		0.5		T	0 = 04 33 47.5 Southern Bolivia
21 Mar		eP	06	18	16.2	12	1.4			
		e			25.8		0.9		T	
21 Mar		eP	06	27	55.8	2	0.8		T	
21 Mar		eP	06	34	49.0	3	1.0		T	
21 Mar		eP	06	38	07.0	4	0.7			
		e			14.2		1.0		T	
21 Mar		eP	06	47	28.0	1	0.8		T	
21 Mar		eP	07	51	09.0	3	0.8			
		e			22.8		0.8		T	
21 Mar		eP	09	34	57.0	3	0.9		T	21.8 S 179.9 W, h about 595 km
										0 = 09 22 31.7 South of Fiji
										Islands
21 Mar	LP	eSur	10	26	48				T	Weak surface on LP
21 Mar		eP	16	34	46.2	3	1.0			
		e		35	04.8		0.8		T	
21 Mar		eP	19	29	05.8	1	0.8		T	
22 Mar	LPN	eSur	05	04	00				T	9.0 S 157.9 E, h about 41 km
										0 = 04 14 03.4 Solomon Islands
										Weak surface waves
22 Mar		eP	06	47	20.7	2	0.8			23.4 S 176.1 W, h about 25 km
		e			34.8		0.8		T	0 = 06 34 03.4 Tonga Islands
										region
22 Mar		eP	14	09	09.4	3	0.8		T	18.0 S 178.3 W, h about 160 km
										0 = 13 56 59.5 Fiji Islands

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
22 Mar		eP	14	24	59.4	999				11.8 N 86.8 W, h about 172 km
		e		25	19.4		1.0			0 = 14 19 46.5 Near coast of
	E	eS		29	28.0		3.6			Nicaragua. Weak surface on LP
	BBE	e		30	00		9.0			
		eScP		32	03.0		0.8			
	LP	eSur			30		35.0		T	
22 Mar		eP	16	16	07.6	2	0.7		T	
22 Mar		eP	16	43	53.6	9	0.2			
		eS			58.4	999			L	△(S-P) = 0.1°
22 Mar		eP	18	10	29.4	2	0.2			
	E	eS			51.1		0.4		NR	△(S-P) = 1.6°
22 Mar		eP	21	33	58.5	6	1.2		T	
22 Mar		eP	21	41	24.8	1	0.6			24.6 S 179.3 E, h about 517 km
		e		43	28.4		0.8			0 = 21 28 41.6 South of Fiji
		ePP		45	25.0		1.2		T	Islands
22 Mar		eP	23	25	35.0	2	0.2			
	E	eS			56.2		0.4		NR	△(S-P) = 1.6°
23 Mar		eP	01	14	02.1	1	0.4		T	43.5 N 12.9 E, h about 116 km
										0 = 01 02 01.6 Near coast of
										Northeastern Italy
23 Mar		e(SKP)	02	10	05.2		1.0		T	1.0 S 120.2 E, h about 10 km
										0 = 01 47 27.6 Celebes
23 Mar		eP	04	52	48.5	3	1.0		T	
23 Mar		eP	05	35	28.9	3	0.9		T	
23 Mar		eP	11	09	02.6	2	1.1		T	
23 Mar		eP	23	44	17.0	2	0.5			
		eS			50.7		0.5		NR	△(S-P) = 2.7°
24 Mar		eP	02	21	44.2	5	0.9			8.5 S 74.7 W, h about 175 km
		e		22	07.3		0.9			0 = 02 13 14.1 Peru
		e			16.7		0.8			
		e			54.5		1.0			
		ePcP		23	07.2		0.7			
		e			31.7		1.0			
		e			44.6		0.7		T	

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
24 Mar		eP	05	08	08.5	1	0.6		T	
24 Mar		eP	15	23	50.0	18	1.6	SW		
		e		24	01.8		1.7			
	LPE	e(S)		28	40		19.0			
	E	e		29	03.2		2.0			
	BBE	e			09		13.0			
	LP	e(SS)		30	08		20.0		T	△(S-P) = 29°
24 Mar		eP	16	21	22.8	2	1.0		T	
24 Mar		eP	19	39	32.4	4	1.2		T	
24 Mar		eP	23	10	10.4	35	1.6			35.3 N 140.9 E, h about 102 km
		e			17.4		0.9			0 = 22 47 14.2 Near east coast
		e		13	22.8		1.4			of Honshu, Japan
		e			35.6		1.2			
		e		18	46.2		1.1			
	BB	e		21	00		10.0			
	LPN	e			10		24.0			
	LP	e		27	33		35.0			
		ePKKP			38.2		1.0			
	LPN	e		37	12		32.0			
	LPN	e(SKKKS)		38	29		27.0			
	LPN	eSur		43	00				T	
24 Mar		ePP	23	56	50.0		1.8			2.6 S 141.9 E, h about 118 km
		e			59.6		1.8		T	0 = 23 37 17.1 Near north coast
										of New Guinea
25 Mar		eP	00	06	37.5	3	1.0		T	
25 Mar		eP	01	16	21.4	3	0.7		T	
25 Mar		eP	02	17	45.1	13	0.6			2.1 S 79.4 W, h about 25 km
		e		18	11.0		1.2			0 = 02 09 59.9 Ecuador
		ePcP		19	42.4		0.8		T	
25 Mar		eP	05	56	04.7	1	0.9		T	
25 Mar		eP	06	08	31.6	1	0.7		T	
25 Mar		eP	11	53	35.8	3	1.0		T	
25 Mar		eP	14	27	42.2	5	0.9			17.5 S 179.0 W, h about 688 km
		e			49.0		0.7		T	0 = 14 15 38.1 Fiji Islands
25 Mar		eP	19	56	29.5	1	0.7			
		e			34.6		0.7		T	

DATE	Syst.	Phase	Arrival Time G.C.T.	Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h. m. s.					
25 Mar		eP	20 49 26.5	1	0.5			
	N	eSur	51 12.5		0.6		R	
25 Mar		eP'	21 18 25.4	14	1.2			37.1 S 51.6 E, h about 137 km
		e	34.9		1.3			0 = 20 58 41.9 Indian Ocean,
		e	47.8		1.3			about 800 miles south of
		e	20 18.0		1.2		T	Malagasy Republic
26 Mar		eP	00 46 22.0	1	0.8		T	
26 Mar		eP	02 31 10.1	1	0.6		T	
26 Mar		eP	08 36 51.6	2	0.6		T	
26 Mar		eP	10 23 44.0	1	0.7		T	
26 Mar		eP	10 23 58.1	2	0.7		T	
26 Mar		eP'	14 48 07.8	9	1.1			5.7 N 126.4 E, h about 147 km
		e	29.0		1.1			0 = 14 29 23.8 Mindanao,
		ePP	49 34.5		1.1			Philippine Islands
		e	54.8		1.4			
		e	51 11.1		1.2			
		eSKP	34.2		1.6			
		e	53 04.5		1.0			
		ePKKP$_1$	58 07.8		0.6			
		ePKKP$_2$	39.5		0.7		T	
26 Mar		eP	20 19 11.3	5	0.7		T	55.5 N 163.7 W, h about 218 km
								0 = 20 10 46.6 Bristol Bay
26 Mar		eP	23 41 04.2	3	0.8		T	
27 Mar		eP	02 37 06.5	2	0.9		T	
27 Mar		eP'	04 42 02.6	3	1.0		T	4.8 S 125.1 E, h about 43 km
								0 = 04 22 48.3 Banda Sea
27 Mar		eP	09 04 08.7	5	1.1			36.6 N 116.3 W, h about 24 km
		e	05 06.1		1.0			0 = 09 00 39.7 Southwestern
	N	eSur	08 10.0		1.5			Nevada. Mag. = 4-1/2 (Pas)
	LPE	eSur	22				R	Medium surface waves on all
								systems
27 Mar		eP	10 21 17.7	1	0.8		T	
27 Mar		eP	11 31 27.0	2	0.8			
		e	39.5		0.8		T	
27 Mar		eP	13 19 28.2	3	1.0		T	
27 Mar		eP	13 25 10.4	2	1.1		T	
27 Mar		eP	14 23 32.0	2	0.5		T	

DATE	Syst.	Phase	Arrival Time G.C.T.	Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h. m. s.					
27 Mar		eP	18 02 52.2	2	0.2			
		eP	03 02.5		0.4			
	E	eS	14.1		0.4		NR	$\triangle$(S-P) = 1.6°
27 Mar		eP	18 13 24.2	5	0.9		T	
27 Mar		eP	18 30 29.9	1	0.2			
		eS	31 07.0		0.5		NR	$\triangle$(S-P) = 3.0°
27 Mar		eP	18 56 53.3	2	0.8		T	
27 Mar		eP	19 51 59.1	1	0.7		T	
27 Mar		eP	20 58 15.8	3	0.8			8.8 N 104.2 W, h about 26 km
		e	36.7		0.9			0 = 20 52 39.3 Pacific Ocean,
		ePcP	21 01 49.8		0.7			about 700 miles south of
	BBN	eS	02 47		8.5			Michoucan, Mexico. Strong
	N	eS	56.9		2.7			surface on all systems.
	LPE	eSur	05 47					
	BBE	eSur	52		7.0			
	BBE	e	06 47		9.0			
	LP	eSur	07 27					
	BB	eSKKS	31 12		7.0		T	
27 Mar		eP	21 02 56.2	13	1.0			Strong surface on all systems
		ePcP	06 35.1		0.8			
	LPE	eSur	10 02					
	BBE	eSur	32		8.0			
	BBE	e	11 28		9.0			
	LP	eSur	12 11			SE	T	
27 Mar		eP	21 30 08.9	4	0.2			
	E	eS	30.9		0.4		NR	$\triangle$(S-P) = 1.6°
27 Mar		eP	22 25 08.3	9	1.0			Medium surface waves on LP
		e	25.5		1.0			and BB
	BBE	eSur	32 50		7.0			
	BBE	e	33 38		5.5			
	LP	eSur	34 22				T	
27 Mar		eP	23 27 05.7	4	1.0			Weak surface waves on LP and
		e	48.4		1.3			BB
	LP	eSur	36 20		18.0		T	
28 Mar		eP	00 57 21.4	2	0.8		T	
28 Mar		eP	01 03 27.5	1	0.3			
	E	eS	49.4		0.4		L	$\triangle$(S-P) = 1.4°

DATE	Syst.	Phase	Arrival Time G.C.T.	Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h. m. s.					
28 Mar		eP	01 15 00.2	1	1.0		T	
28 Mar		eP	03 49 53.6	1	0.6			
		e	50 12.2		0.7		T	
28 Mar		eP	05 12 47.8	3	1.0		T	
28 Mar		eP	06 08 50.8	3	0.6			52.8 N 167.7 W, h about 49 km
		e	09 17.2		0.7			0 = 05 59 50.5 Fox Islands,
		e	34.9		1.0			Aleutian Islands
		ePcP	10 05.7		0.8		T	
28 Mar		eP	09 51 40.7	9	1.6			Possibly P diffracted
	LP	e	44		26.0			
		e	52 14.7		1.4			
		e	35.8		0.8			
		e	53 04.0		1.0			
		e	54 00.2		1.0			
		e	38.6		1.0			
28 Mar		iP'	09 54 55.5	246	1.4			0.2 N 123.6 E, h about 83 km
	LP	eP'	57		12.0			0 = 09 35 55.4 Northern Celebes.
	IB	e	55 08	999				Mag. = 6-3/4 (Pas), 7 (Pal)
		e	40.2		1.8			Strong surface on LP and BB.
	BB	e	56 11		12.0			Weak surface waves on SP and IB
	LP	ePP	55		25.0			
		e	57 28.7		1.7			
	BB	e	44		10.0			
	LP	e(PKS)	58 51		18.0			
		e	59 52.2		2.0			
	E	e	10 00 48.7		1.5			
	LP	e	01 00		22.0			
	LP	eSKS	46		16.0			
	E	eSKS	52.5		2.0			
	LPE	e	02 32		22.0			
		e	55.2		2.6			
	BBE	e	03 04		8.0			
	LP	e(SKKS)	22		23.0			
	E	e(SKKS)	32.2		2.0			
	BBN	e(SKKKS	52		6.0			
		ePKKP	04 23.2		1.0			
	LPE	e	25		21.0			
	BBE	e	05 32		11.0			

(continued on next page)

(continued from preceding page)

DATE	Syst.	Phase	Arrival Time G.C.T.	Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h. m. s.					
		e	10 05 54.2		1.3			
	LP	eSKSP	06 18		29.0			
		e	40.2		1.3			
	LP	e(SP)	07 22		23.0			
		e(SKKP)	51.2		2.3			
		ePcPP'	08 20.2		1.4			
		e	44.2		1.8			
		eP'P'	13 34.7		1.0			
	LP	e(SS)	14 27		23.0			
	E	e	34.7		3.3			
	N	e	15 44.2		1.6			
	LP	eSur	28 42					
	SP	eSur	33 30					
	LP	eSur	36 30				T	
28 Mar		eP	10 34 29.8	1	0.9		T	
28 Mar		iP	12 38 50.8	c 335	1.4			51.7 N 176.2 W, h about 60 km
	IBE	iS	46 38		3.5			0 = 12 29 12.7 Andreanof
	BBE	iS	39		6.7			Islands, Aleutian Islands.
	SPE	iS	40.2		3.7			Mag. = 6-1/4 (Pas), 5-1/2 (Pal).
		e	49.7		3.0			Strong surface waves on LP
	N	eScs	48 34.7		2.0			and BB.
	LPE	e	50 40		31.0			
	LPE	eSur	53 02					
	LPN	eSur	55 10					
	LPE	eSur	58 02					
	LP	e	13 04 27		18.0			
		eP'P'	08 23.7		1.1			
		eP'P'$_2$	53.0		1.1		T	
28 Mar		eP	12 39 10.0	999	1.4	NW		
	E	eS	47 00.0		2.4			△(S-P) = 5.6°
	N	eScS	48 59.7		1.5			
		eP'P'$_1$	13 08 42.0		1.1			
		eP'P'$_2$	09 13.0		1.7		T	
28 Mar		eP	12 44 26.2	2	0.2			
	E	eS	47.8		0.3		NR	△(S-P) = 1.6°

DATE	Syst.	Phase	Arrival Time G.C.T.			Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h.	m.	s.					
28 Mar		eP	14	08	38.8	18	1.3			Weak surface waves on LP
		e			52.2		1.7			
		e		09	37.6		1.0			
	LP	eSur		21	57				T	
28 Mar		eP	14	36	44.6	3	1.0			
		e			54.2		1.0		T	
28 Mar		eP'	15	42	33.4	2	0.8		T	2.2 N 125.8 E, h about 280 km
										0 = 15 23 50.3 Celebes Region
28 Mar		eP	16	34	15.0	2	0.8		T	
28 Mar		eP	17	11	05.6	15	0.4			
		eP			15.2		0.5			
		eS			26.8	999			NR	△(S-P) = 1.5°
28 Mar		eP	17	18	53.2	1	0.7		T	
28 Mar		eP	17	55	27.2	2	0.2			
		eS			33.8		0.3		L	△(S-P) = 0.2°
28 Mar		eP	21	12	17.4	95	0.8			22.0 S 68.0 W, h about 125 km
		ePcP			45.0		1.0			0 = 21 01 56.2 Chile - Bolivia
		e			57.0		1.0			border region. Mag. = 6 (Pas)
	IB	e		15	15		3.0			Strong surface on LP
	IB	eScP		16	45		2.8			
		e		18	21.0		1.6			
		e		18	54.0		2.0			
	BBE	eS		20	40		8.0			
	BBE	eScs		21	30		9.0			
	BBE	e		22	53		6.0			
	LPN	eSS		24	52		25.0			
	LPN	eSur		28	10					
	LPN	eSur		31	20				T	
28 Mar		eP	21	40	55.8		0.3			
	E	eS		41	17.2		0.4		NR	△(S-P) = 1.5°
28 Mar		eP	21	49	15.2	6	1.0			
		e			47.2		1.0		T	
28 Mar		eP	23	04	32.8	8	1.6			Weak surface waves on LP
	LP	eSur		23	21				T	
29 Mar		eP	06	56	44.5	5	0.8			33.5 N 140.9 E, h about 116 km
		e			59.0		0.9		T	0 = 06 43 43.3 Near east coast
										of Honshu, Japan

DATE	Syst.	Phase	Arrival Time G.C.T.			Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h.	m.	s.					
29 Mar		eP'	09	53	60.7	8	1.2		T	0.2 N 123.9 E, h about 84 km
										0 = 09 35 02.1 Northern
										Celebes
29 Mar		eP	18	23	09.5	1	0.7		T	37.1 N 141.3 E, h about 127 km
										0 = 18 10 24.4 Near east coast
										of Honshu, Japan
29 Mar		eP	23	04	35.5	1	0.8		T	
29 Mar		eP	23	42	45.7	1	0.5			
	N	eS		43	27.2		0.6		NR	△(S-P) = 3.4°
30 Mar		eP'	01	41	11.2	4	1.0		T	0.3 N 123.9 E, h about 159 km
										0 = 01 22 19.1 Northern
										Celebes
30 Mar		eP	05	55	16.8	3	0.2			
		eS			37.5		0.4		NR	△(S-P) = 1.5°
30 Mar		eP	07	43	13.8	3	1.0		T	
30 Mar		eP	07	46	32.2	42	2.0			22.0 N 107.8 W, h about 20 km
	LPE	eS		49	10		13.0			0 = 07 42 59.4 Gulf of California
	E	eSur			37.0		1.8			Mag. = 5-1/2 (Pal). Strong
	LPE	eSur		50	00					surface waves on all systems
	BBE	eLg			46		7.0			
	E	eSur			33.0		2.5		R	
30 Mar		eP	07	56	18.6	6	1.2			
		e		57	50.2		0.7		T	
30 Mar		eP	08	17	20.7	2	0.8			
	E	eSur		21	10.9		1.0		R	
30 Mar		eP	09	02	29.8	33	1.3			15.2 S 172.8 W, h about 25 km
		e		04	29.0		1.0			0 = 08 49 45.6 Samoa Islands
	BBE	eS		13	00		12.0			region. Mag. = 5-3/4 - 6 (Pas),
	LPE	ePS		14	00		22.0			5-3/4 (Pal). LPZ inoperative.
	LPN	eSS		18	43		22.0			Medium surface waves on LP
		ePKKP		20	34.2		1.2			and BB
	LPE	eSur		25	40					
	LPN	eSur		30	10				T	
30 Mar		eP	11	09	37.5	3	1.0			22.3 N 107.8 W, h about 67 km
		e		10	03.3		0.9			0 = 11 06 11.8 Gulf of California
	E	eSur		13	42.2		1.3		R	

DATE	Syst.	Phase	Arrival Time G.C.T.			Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h.	m.	s.					
30 Mar		eP	12	06	25.2	2	0.8			
		e			52.4		0.6		T	
30 Mar		eP	15	30	39.6	4	1.2			
		e		32	33.6		0.8		T	
30 Mar		eP	17	17	03.2	5	1.0		T	
30 Mar		eP	20	51	57.6	1	0.4			
	E	eSur		53	32.2		0.6			
	E	eSur		54	12.2		0.6		R	
31 Mar		eP	05	33	33.6	6	1.0		T	32.6 N 135.7 E, h about 300 km 0 = 05 20 36.8 South of Honshu, Japan
31 Mar		eP	06	27	51.4	1	0.6		T	
31 Mar		eP	13	48	11.6	3	1.0			
		e			26.6		1.0		T	
31 Mar		eP	17	22	57.2	4	0.8		T	
31 Mar		eP	21	10	12.8	8	0.9			
		e			25.5		0.9		T	
31 Mar		eP	21	35	46.5	3	1.0		T	
31 Mar		eP	22	39	38.6	5	1.2		T	
31 Mar		eP	23	30	05.8	4	0.8		T	29.9 S 69.4 W, h about 100 km 0 = 23 19 00.8 San Juan Province, Argentina.

Copied 7/5

WICHITA MOUNTAINS SEISMOLOGICAL OBSERVATORY
FORT SILL, OKLAHOMA, U.S.A.

Operated under the Technical Supervision of the
Air Force Technical Applications Center (AFTAC)

By

The Geotechnical Corporation, Garland, Texas

B. B. Leichliter, Chief Seismologist

REPORT ON THE REGISTRATION OF EARTHQUAKES FOR APRIL 1961

Volume 1, No. 4

By Robert C. Shopland, Project Engineer;

Seismograms read by Gayle Stanfill and Cecil Morgan

Advanced Research Projects Agency (ARPA)
DEPARTMENT OF DEFENSE,
UNITED STATES GOVERNMENT

THE REGISTRATION OF EARTHQUAKES

AT THE

WICHITA MOUNTAINS SEISMOLOGICAL OBSERVATORY

STATION

Station Abbreviation: WMSO
Station Identification on Film Seismograms: a
Geographical Location*: 34° 43' 05.3" N. Lat.
(Vault No. 6) 98° 35' 20.7" W. Long.

GEOCENTRIC LOCATION*: 34° 32' 09.8" N. Lat.
(Vault No. 6) 98° 35' 20.7" W. Long.

ALTITUDE (Meters)*: 505 Meters (1658 feet)
(Vault No. 6)

GEOLOGY: The station is located on the Carlton (porphyritic) granophyre of the Wichita Mountains of Oklahoma.

NOISE LEVEL - April 1961: The periods of the predominant microseisms at WMSO are 0.5 second and 6 seconds. An amplitude distribution curve for the 0.5 second microseisms may be found on page 2.

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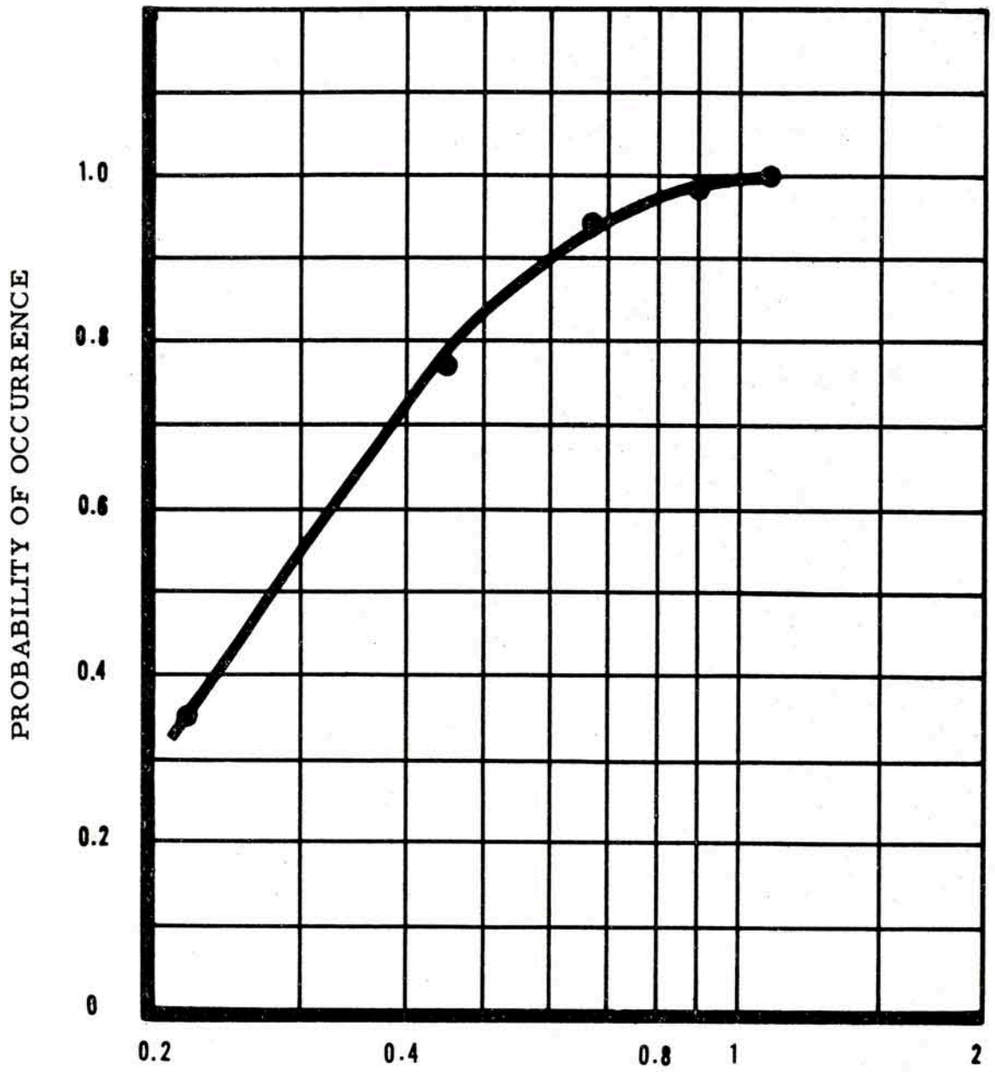
* The coordinates refer to the location of vault no. 6 which houses the 3-component groups of short-period and intermediate band seismometers from which arrival times are determined.



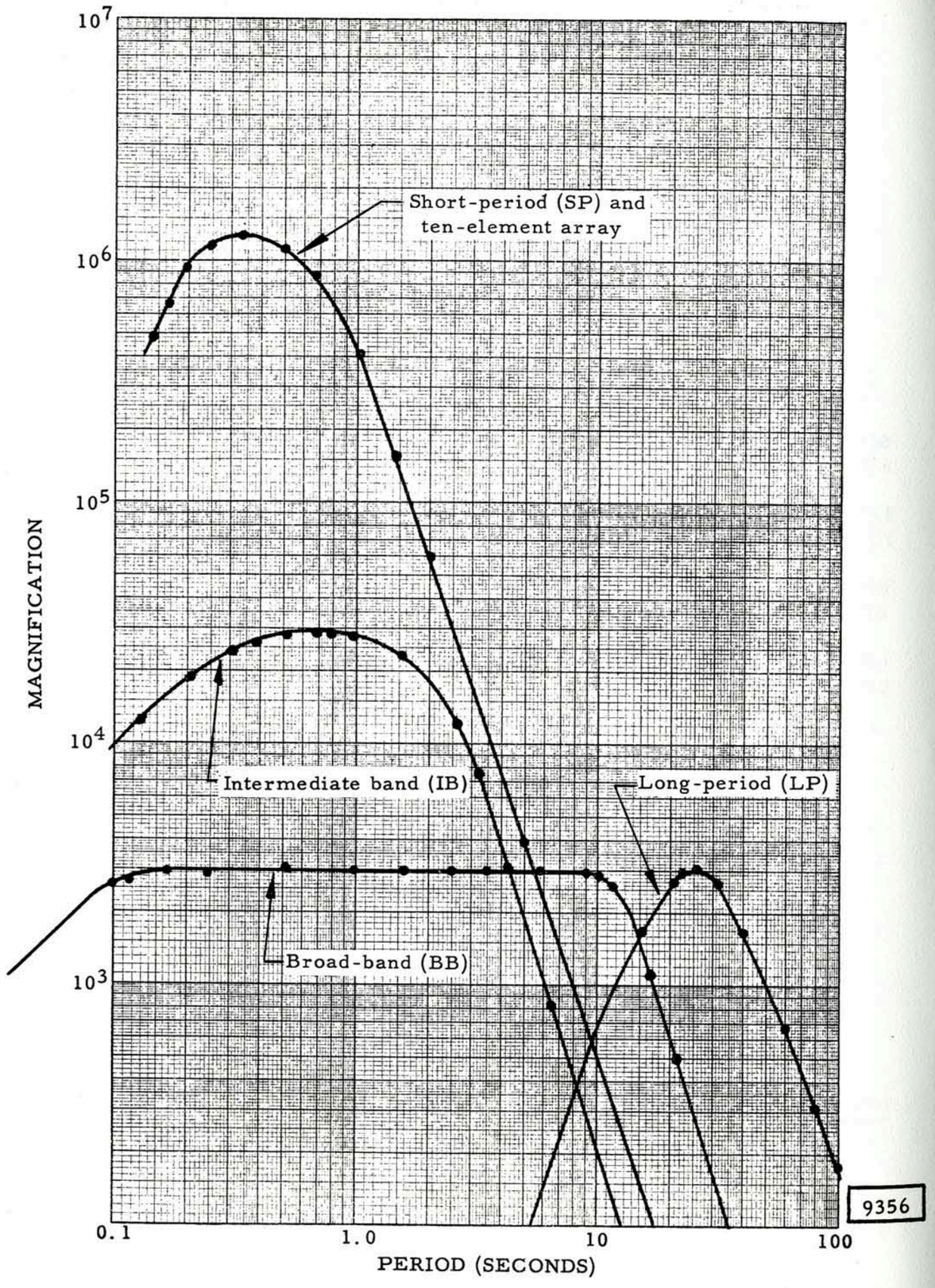
Probability of predominant 0.5-sec microseisms occurring at or less than a given amplitude at Unity magnification

SEISMOGRAPHS

	Ts	λs	Tg	λg	σ^2
SP Vertical Benioff	1.0	1.0	0.2	1.0	0.01
SP Horizontal Benioff	1.0	1.0	0.2	1.0	0.01
IB Vertical Melton	2.5	0.65	0.64	1.5	0.002
IB Horizontal Sprengnether	2.5	0.65	0.64	1.5	0.0005
BB Vertical Press-Ewing	12.5	0.4	0.64	9.0	0.0002
BB Horizontal Sprengnether	12.5	0.4	0.64	9.0	0.0004
LP Vertical Sprengnether	25.0	1.0	30	1.0	0.004
LP Horizontal Sprengnether	25.0	1.0	30	1.0	0.004

SP = Short Period
IB = Intermediate Band
BB = Broad Band
LP = Long Period
Ts = Free Period of seismometer in secs.
λs = Damping constant of seismometer
Tg = Free Period of galvanometer in secs.
λg_2 = Damping constant of galvanometer
σ = Coupling Coefficient

NOTE: Response curves may be found on page 4.



Response characteristics of seismographs

INTERPRETATION OF SYMBOLS

1. Earthquakes Listed

All local (L), near-regional (NR), regional (R), and distant earthquakes (T) are tabulated on the following pages.

2. System

In the column headed "Syst." (system), the seismograph (SP, IB, BB, or LP) and component (Z, N, or E) used to measure arrival time are designated. When no component designation appears, the phase is read from the vertical component. When neither system nor component designation appears, the phase is read from the SP vertical component.

3. Phase

(1) "i" (impetus) preceding a phase designates sudden beginning of the motion. (A designation of "i" in the case of initial P motion indicates a signal-to-noise ratio exceeding about 5/1).

(2) "e" (emersio) designates gradual beginning.

(3) "i" or "e" alone designates an unidentified phase.

(4) ( ) (parenthesis marks) indicate uncertainty.

4. Time

(1) Date and arrival time are given in Greenwich Civil Time (G. C. T.)

(2) The arrival time is reported as the earliest time on Z, N, or E. Single Z rather than the array summation ($\sum$) is used for measuring arrival times on the SP seismographs.

5. Ground Motion

(1) In the columns headed "A" and "T" are tabulated earth displacement in millimicrons and period in seconds, respectively. An amplitude of 999 indicates that a signal cannot be measured reliably. A "c" or "d" in the "A" column indicates compression or dilation, respectively, of the ground as indicated by the vertical component instrument.

The value of "A" for P phases is the maximum amplitude in the first ten seconds. All amplitudes are center-to-peak amplitudes.

(2) Trace amplitudes are measured to the nearest 1/2 millimeter at X10 view.

6. Direction

In the column headed "Dir." (direction), the direction of the epicenter as viewed from WMSO is indicated. For teleseisms, direction is obtained only from P and Rayleigh waves and is listed opposite the phase from which it is obtained. For close events, direction may be obtained from P-wave step-out shown on the individual short-period vertical traces.

7. Type

Earthquakes are identified as either:

L	(local) - - - - - - - - - - - -	0^o	-	1.4^o
NR	(near-regional) - - - - - -	1.4^o	-	6^o
R	(regional) - - - - - - - -	6^o	-	16^o
T	(teleseismic) - - - - - - - -	16^o	-	180^o

8. Remarks Column

(1) Epicentral locations, time of origins, depth of foci, and magnitudes are obtained from the U.S. Coast and Geodetic Survey Preliminary Determination of Epicenters cards.

(2) The nature of the surface waves is indicated subjectively.

(3) Epicentral locations and distances reported by the station are accompanied by an indication of the phases used to determine epicentral distance, e.g. $\triangle$ (S-P) = 6^o, Central Colorado.

(4) Operational notes refer to operational difficulties that affect analysis of data.

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
01 Apr		eP	02	53	55.8	8	1.0		T	30.5 N, 139.7 E, h about 135 km. 0 = 02 40 43.8 South of Honshu, Japan
		ePP		57	37.4		1.0			
01 Apr		eP	04	36	25.7	3	1.0		T	
01 Apr		eP	06	42	21.7	2	0.5		T	
		e			45.8		0.8			
01 Apr		eP	08	19	33.9	4	0.6		T	50.6 N, 159.9 E, h about 38 km. 0 = 08 08 19.4 Off east coast of Kamchatka
		e		20	29.6		1.0			
01 Apr		eP	10	33	21.1	2	0.7		T	
		e			38.8		0.6			
01 Apr		eP	11	54	32.7	6	1.4		T	
01 Apr		eP	13	37	25.3	1	0.9		T	
		e			44.2		0.8			
		e		38	05.2		1.0			
01 Apr		eP	14	38	45.9	2	0.8		T	
01 Apr		eP	15	32	40.4	9	1.4		T	39.6 N, 77.7 E, h about 21 km. 0 = 15 18 22.8 Sinkiang Province, China. Mag. 6 (Pal) Strong surface waves on all systems
		e			52.8		1.2			
		e		34	14.2		1.4			
		e		35	02.8		1.0			
		e			42.4		1.2			
		e		36	35.8		2.6			
	BB	ePP			50		6.5			
	BB	ePPP		38	54		7.0			
	BBE	e		39	33		8.0			
		eSKS		43	03.3		1.6			
	BBN	eSKS			18		9.0			
	BBN	e		44	03		11.0			
	BBE	e			31		7.0			
	BB	eSP		46	11		10.0			
	LPN	ePPS		47	04		19.0			
		ePKKP		48	14.8		1.3			

(continued on next page)

DATE	Syst.	Phase	Arrival Time G.C.T.			Ground Motion A	Ground Motion T	Dir.	Type	Remarks
	BB	e			22		7.0			(continued from preceding page)
	BBE	eSS		51	55		11.0			
	BBE	e		53	44		8.0			
	LPE	e(SSS)		56	00		21.0			
	LPN	e	16	02	00		21.0			
	LPE	e		07	30		26.0			
	LPE	e		11	49		27.0			
	LPN	eSur		23	00					
		eSur		24	00					
01 Apr		eP	21	39	45.2	3	1.0		T	
01 Apr		eP	22	15	12.0	4	1.0		T	
		e			18.1		1.0			
		e			23.5		1.0			
02 Apr		eP	01	02	36.1	9	1.0		T	
		e			45.4		1.6			
02 Apr		eP	01	15	13.6	1	0.6		T	
		e			27.1		0.7			
02 Apr		eP	02	57	59.8	1	0.5		T	30.6 N, 138.4 E, h about 175 km. 0 = 02 44 49.5 South of Honshu, Japan
		e		58	03.4		1.0			
02 Apr		eP	04	13	15.6	5	0.8		T	
02 Apr		eP	04	25	05.6	1	0.9		T	
02 Apr		eP	11	23	01.4	1	0.8		T	8.6 S, 75.0 W, h about 169 km. 0 = 11 14 30.1 Peru
		epP			32.6		0.8			
		ePcP		24	24.8		0.6			
02 Apr		eP	12	32	57.3	2	1.0		T	
02 Apr		eP'	13	19	54.2	3	0.9		T	1.6 S, 100.6 E, h about 25 km. 0 = 13 00 26.4 Near coast of Sumatra
		e		20	15.8		1.0			
02 Apr		eP	14	56	19.5	6	1.0		T	24.3 S, 115.0 W, h about 41 km. 0 = 14 46 08.1 - 700 km northwest of Easter Island. Weak surface on LP
	LPN	eSur	15	16	55					
	LPN	eSur		18	20					

DATE	Syst.	Phase	Arrival Time G.C.T.			Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h.	m.	s.					
02 Apr		eP	15	49	42.4	1	0.7		T	
02 Apr		eP	15	51	40.8	1	0.5		R	
		e		55	26.4		0.9			
	LPN	eSur			48					
02 Apr		eP	21	05	36.1	1	0.7		T	
		e			47.4		0.9			
02 Apr		eP	22	37	54.7	1	0.7		T	
03 Apr		eP	01	17	19.0	21	1.0		T	6.8 N 72.9 W, h about 221 km. 0 = 01 10 32.2 Colombia
		e			24.8		0.8			
		e		18	13.8		0.8			
		e			53.3		1.1			
	N	eS		22	48.0		1.2			
		eScP		23	12.8		0.8			
03 Apr		eP	02	54	50.2	3	0.7		T	53.6 N 161.1 E, h about 25 km. 0 = 02 43 48.9 Near east coast of Kamchatka
		e			56.4		0.7			
03 Apr		eP	02	59	23.0	1	0.9		T	
		e			29.5		0.7			
		e			36.1		0.6			
03 Apr		eP	03	28	33.5	1	0.7		T	
03 Apr		eP	05	56	15.1	1	0.8		T	
		e			23.5		0.8			
03 Apr		eP	08	00	36.8	23	0.9		T	17.5 N 84.1 W, h about 92 km. 0 = 07 55 52.1 North of Swan Island, Caribbean Sea.
		e			48.6		1.0			
		e			57.0		1.1			
		e		04	30.7		0.7			
	BBE	eSur			42					Medium surface waves on BB and weak surface waves on LP
	LPN	eSur			47					
03 Apr		eP	08	50	44.7	2	0.7		T	

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
03 Apr		eP	10	53	09.8	2	0.7		T	
03 Apr		eP	16	43	15.9	9	0.7		T	52.5 N 158.9 E, h about 38 km. 0 = 16 32 04.3 Near east coast of Kamchatka
03 Apr		eP	20	16	14.3	1	0.5		R	
		eSur		17	32.5		0.6			
04 Apr		eP	01	25	47.8	3	0.6		NR	Δ(S-P) = 1.7°
	N	eS		26	09.5	999				
04 Apr		eP	07	14	25.0	3	0.8		T	
		e			33.2		0.8			
04 Apr		eP	08	00	29.4	8	1.0		T	19.6 S 177.1 W, h about 276 km. 0 = 07 47 48.1 Fiji Islands region
		epP		01	45.0		0.9			
		e		02	35.4		1.2			
04 Apr		eP	10	01	01.4	3	0.8		T	40.1 N, 77.8 E, h about 16 km. 0 = 09 46 36.6 Sinkiang Province, China. Strong surface on LP and BB.
		e		03	36.8		0.7			
		e		04	23.2		0.8			
		ePP		05	11.8		1.4			
		e		06	22.5		1.4			
		ePKKP		16	28.2		0.7			
		ePKKP			47.0		0.7			LPZ inoperative
		e		19	27.9		1.2			
	LPN	e		21	00		37.0			
	LPN	e		24	25		25.0			
	LPN	eSur		35	28					
	LPN	eSur		50	00					
	LPN	eSur		52	10					
	BB	eSur			30					
04 Apr		ePP	10	54	14.7	1	1.5		T	5.9 S, 149.4 E, h about 124 km. 0 = 10 35 11.1 New Britain region
	LPN	ePS	11	03	35		18.0			
		ePKKP		04	40.4		0.8			
	BB	e(SPP)			56		15.0			
	BB	e		06	17		11.0			
	BB	e		08	05		15.0			
	BB	e(SS)		10	00		15.0			

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
04 Apr		eP	12	59	16.5	5	0.8	NW	T	
04 Apr		eP	13	15	47.5	3	0.8		T	Possible PKKP of preceding event
		e			55.1		1.0			
04 Apr		eP	19	55	36.6	2	0.4		NR	Δ(S-P) = 1.7°
		e			46.0		0.4			
	E	eS			58.0	999				
04 Apr	BB	eSur	21	42	00				T	Medium surface on BB. LP's inoperative
04 Apr		eP	22	19	08.8	4	1.2		T	
04 Apr		eP	22	46	28.7	42	0.3	NW	L	Δ(S-P) = 0.2°
		eS			34.0	999				
04 Apr		eP	23	42	33.0	1	0.5		NR	Δ(S-P) = 3.5°
		eS		43	14.6		0.5			
05 Apr		eP	01	09	04.0	2	0.4		NR	Δ(S-P) = 1.5°
	E	eS			24.7		0.4			
05 Apr		eP	03	15	01.6	1	0.6		T	
05 Apr		eP	05	03	09.0	4	1.0		T	
		e			46.0		1.0			
05 Apr		eP	06	17	49.4	3	1.0		T	
05 Apr		eP	06	28	37.0	3	1.0		T	
05 Apr		eP	08	05	57.6	1	0.8		T	
		e		06	05.0		0.6			
05 Apr		eP	17	39	43.4	3	0.2		NR	Δ(S-P) = 2.6°
	E	eS		40	15.0		0.4			
05 Apr		eP	18	03	18.0	1	0.3		NR	Δ(S-P) = 1.7°
	E	eS			39.6		0.4			

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
05 Apr		eP	19	50	18.0	2	0.3		NR	△(S-P) = 2.0°
	E	eS			43.0		0.4			
05 Apr		eP	22	19	22.0	3	1.0		T	
05 Apr		eP	22	46	02.9	1	1.0		T	
05 Apr		eP	23	35	00.6	1	0.3		NR	△(S-P) = 1.7°
		eS			22.7	999				
06 Apr		eP	01	52	03.4	3	1.0		T	
06 Apr		eP	02	58	45.4	3	1.0		T	
06 Apr		eP	03	30	42.2	4	0.9		T	44.3 N 148.1 E, h about
		e			57.0		0.8			26 km. 0 = 03 18 28.1
										Kurile Islands
06 Apr		iP	04	09	30.5	c 26	0.5		T	40.1 N 124.8 W, h about 73
	LP	eP			35		15.0			km. 0 = 04 04 46.1 Near
		e		13	32.7		1.2			coast of northern California
	LPN	e(S)			44		18.0			Mag. 5 (Berk)
	LPE	eSur		15	39					
	LPN	eSur		16	15					
		e			40.0		5.0			
	BB	e		18	57		14.0			
06 Apr		eP	07	50	44.0	2	0.9		T	
06 Apr		eP	12	45	50.4	4	0.6	SE	T	
		e		49	43.6		1.0			
06 Apr		eP'	14	24	24.2	2	0.7		T	2.2 N 97.2 E, h about 25
		e		25	04.5		0.9			km. 0 = 14 05 00.3 Near
		ePP		27	28.4		1.2			coast of Sumatra
		eSKP		28	20.4		1.2			
		e			35.5		1.0			
06 Apr		eP	15	42	47.8	2	0.6		T	
06 Apr		eP	16	23	30.6	1	0.8		T	

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
06 Apr		eP	18	30	57.5	2	0.7		T	27.8 N 56.7 E, h about
		e		31	19.0		0.7			109 km. 0 = 18 12 40.7
		ePP			58.9		1.5			Southern Iran
		e		33	57 8		1.3			
	LPN	ePS		41	46		18.0			
		ePKKP			56.0		0.8			
		ePKKP		42	10.0		0.8			
	LPN	e		53	08		32.0			
	LP	eSur	19	03	00					
	LPE	eSur		13	00					
	LP	eSur		17	45					
06 Apr		eP	21	35	02.2	1	0.3		NR	△(S-P) = 1 7°
	E	eS			23.8		0.3			
06 Apr		eP	21	42	49.4	2	0.8		T	
06 Apr		eP'	22	45	54.9	2	0.7		T	1.9 N 96 5 E, h about 25
		ePP		49	00.6		1.1			km. 0 = 22 26 29.6 Near
	LPN	eSur	23	41	00					coast of Sumatra
										Weak surface waves on LP
07 Apr		eP	00	10	01.3	6	1.2		T	
		e		14	20.9		1.0			
07 Apr		eP	00	51	55.5	1	0.3		NR	△(S-P) = 1.6°
	E	eS		52	16.5		0.5			
07 Apr		eP	03	43	10.2	3	0.9		T	
07 Apr		eP	04	59	15.7	4	1.1		T	
07 Apr		ePP	05	11	47.6		1.0		T	36.1 N 70.7 E, h about 60
										km. 0 = 04 52 40.0 Hindu
										Kush region
07 Apr		eP	05	54	05.9	2	0.9		R	44.8 N 112.0 W, h about
	E	eSur		58	22.2		1.1			25 km. 0 = 05 50 40.6
										Hebgen Lake, Montana

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
07 Apr		eP	06	57	25.7	2	1.0		T	
07 Apr		eP	07	04	58.7	15	1.0		T	
		e		05	23.0		0.9			
		e		07	06.9		1.0			
		e		08	04.0		0.6			
07 Apr		eP	07	14	09.7	4	0.8		T	
		e			32.1		0.7			
07 Apr		eP	08	47	17.8	6	0.7		T	51.1 N 156.7 E, h about
		e			30.6		0.7			32 km. 0 = 08 35 54.9
		e			50.0		0.7			Near coast of Kamchatka
07 Apr		eP	10	15	51.8	2	0.9		T	
07 Apr		eP'	10	26	19.3	16	1.1		T	0.3 S 97.0 E, h about 25
		e(PP)		29	29.3		1.2			km. 0 = 10 06 49.5
		ePP		30	33.7		1.9			Near coast of Sumatra
07 Apr		eP	12	16	48.6	2	0.9		T	
07 Apr		eP	14	05	35.7	3	1.1		T	
07 Apr		eP	17	49	43.1	2	0.7		T	19.5 S 177.1 W, h about
										355 km. 0 = 17 37 09.6
										Fiji Islands region
07 Apr		eP	18	40	19.9	3	0.9		T	
07 Apr		eP	20	05	37.0	14	1.0		T	57.2 N 163.3 E, h about
		e			46.5		1.3			20 km. 0 = 19 54 51.9
	LPN	eSur		26	30					Near east coast of Kamchatka
	LP	eSur		32	00					Medium surface on LP
		eP'P'		34	22.8		1.2			
07 Apr		e(PP)	21	36	05.3		1.2		T	39.3 N 73.0 E, h about
										44 km. 0 = 21 17 43.8
										Kurghiz - Tadzhik border

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
07 Apr		eP	23	55	05.7	5	0.8		T	
		e			25.8		1.0			
08 Apr		eP	00	44	50.8	6	1.2		T	Medium surface on LP
		e			55.8		1.2			
	LP	eSur	01	01	30					
08 Apr		eP	01	47	40.2	4	0.8		T	
		e		48	17.0		0.8			
08 Apr		eP	03	14	33.0	5	1.0		T	2.6 S 81.0 W, h about
		e			41.4		0.7			25 km. 0 = 03 06 49.9
		ePcP		16	32.8		0.8			Near coast of Ecuador
08 Apr		eP	03	40	58.8	2	0.6		T	
		e		41	19.7		0.6			
08 Apr		eP	04	29	53.2	20	0.6		T	2.2 S 79.2 W, h about
		ePcP		31	53.5		0.6			25 km. 0 = 04 22 08.7
		e(ScP)		35	43.2		0.8			Ecuador
	LPE	e		36	48		20.0			
	LPN	e		39	22		21.0			
08 Apr		iP	04	54	47.1	c 23	0.7		T	2.1 S 79.1 W, h about
		e		55	24.0		0.9			24 km. 0 = 04 47 01.8
		e(PP)		56	42.0		1.0			Ecuador
		e		57	42.6		1.0			Weak surface on LP
		e		58	25.0		1.2			
		eScP	05	00	35.5		1.2			
	BBE	eS			59		7.0			
	LPE	eS		01	15		22.0			
	LPN	eSur		04	10					
	LPN	eSur		05	48					
	LP	eSur		07	15					
08 Apr		eP	08	13	26.2	2	0.6		T	
		e			36.0		0.6			

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
08 Apr		eP	09	11	33.6	26	0.6		T	2.1 S 79.1 W, h about
		ePP		13	33.7		0.8			24 km. 0 = 09 03 48.9
		eScP		17	21.8		0.8			Ecuador
	N	eS			45.0		3.0			Weak surface on LP
	LPN	eSur		21	00					
	LPN	eSur		22	30					
	LP	eSur		24	55					
08 Apr	LP	eSur	16	48	46				T	18.2 S 168.6 E, h about
										120 km. 0 = 15 59 49.2
										New Hebrides Islands region
										Weak surface on LP
08 Apr		iP	18	11	32.6	c 2267	2.3		T	38.2 S 72.7 W, h about
		e			41.0		2.0			60 km. 0 = 17 59 46.7
	E	eS		21	14.0		2.6			Chile. Mag. 6-1/2 (Pas),
	LPN	eS			18		23.0			5-3/4 - 6 (Pal).
	LPN	e		29	10		20.0			Medium surface on LP.
	LPN	e		32	13		35.0			Weak surface on BB.
	LP	eSur		35	00					
	LP	e(PPP)		40	00		23.0			
08 Apr		eP	19	31	35.4	5	0.8		T	37.6 N 140.3 E, h about
		e		32	09.6		0.8			189 km. 0 = 19 18 54.8
		e			43.0		1.0			Honshu, Japan
08 Apr		eP	20	49	11.6	4	1.0		T	
08 Apr		eP	21	50	27.4	10	1.0		T	14.8 N 145.1 E, h about
		e		51	07.6		0.9			105 km. 0 = 21 36 41.6
		ePP		54	37.6		1.0			Mariana Islands region
		e		55	09.6		1.2			Mag. 6-1/2 (Pas).
	IBE	e	22	00	52		1.5			Weak surface on LP
	LPE	eSKS		01	00		13.0			
	N	e		01	31.8		2.0			
		ePKKP		06	34.3		2.0			
		e			52.6		2.0			
	LPN	eSS		08	50		20.0			
	LP	eSur		24	20					
08 Apr		eP	23	38	58.5	3	1.1		T	

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
09 Apr		eP	04	34	14.7	4	0.7		T	
09 Apr		eP	07	27	35.9	916	3.5		T	36.5 N 121.3 W, h about
	BB	e		28	05		7.0			11 km. 0 = 07 23 16.0
		e			19.5		1.7			San Benito County, California
	BB	e		31	10		13.0			Mag. 5-3/4 (Pas), 5-1/2 -
	BBN	eLg		32	56		8.0			5-3/4 (Berk), 6 (Pal)
	LPN	eSur		33	32					Strong surface waves on all systems.
09 Apr		eP	07	29	58.5	29	1.2		T	37.0 N 120.7 W, h about
	BB	e		38	30		8.0			13 km. 0 = 07 25 41.6
										San Benito County, California
										Mag. 5-1/2 (Pas), 5-1/2 (Berk).
										Occurs in surface waves of previous event
09 Apr		eP	09	50	59.2	3	1.0		T	
09 Apr		eP'	15	53	37.6	9	1.4		T	24.1 N 122.2 E, h about
		ePP		54	15.0		3.0			13 km. 0 = 15 35 05.4
		e		55	07.4		1.4			Near east coast of Formosa
	LPE	eSKS	16	00	20		20.0			Mag. 6 (Pas).
	LP	e(SKKS)		01	00		27.0			Strong surface waves on BB
	LP	eSP		03	32		21.0			and LP.
		$ePKKP_1$		04	51.8		1.0			
	LPN	ePPS		05	00		20.0			
		$ePKKP_2$			08.5		1.5			
	LP	eSKKP		08	18		20.0			
	LPE	eSS		09	42		25.0			
	LPE	e		11	05		27.0			
	LP	e		13	40		25.0			
	LPN	e		18	11		28.0			
	LPN	eSur		24	50					
	LPN	eSur		32	42					

DATE	Syst.	Phase	Arrival Time G.C.T.			Ground Motion A	Ground Motion T	Dir.	Type	Remarks
09 Apr		eP	17	27	47.7	9	1.0		T	18.2 S 70.2 W, h about
		e		28	02.0		1.0			29 km. 0 = 17 17 47.6
		e			18.2		0.8			Chile - Peru border
		ePcP			38.4		1.0			
		e			49.9		1.1			
09 Apr		eP	22	49	27.6	1	0.6		T	
10 Apr		eP	00	39	52.6	3	0.8		T	
		e		40	25.0		1.0			
10 Apr		eP	02	59	01.0	2	0.7		T	
		e	03	03	54.8		2.0			
10 Apr		eP	07	30	58.0	2	0.6		T	
10 Apr		eP	07	48	26.0	6	1.2		T	
10 Apr		eP	08	16	56.4	5	1.3		T	
10 Apr		eP	09	17	46.2	4	1.0		T	
10 Apr		eP	13	10	45.2	5	0.4		R	
	E	eSur		14	36.5		0.9			
10 Apr		eP	18	16	22.8	2	0.2		NR	$\triangle$(S-P) = 1.7°
	E	eS			44.2		0.5			
10 Apr		eP	18	18	06.5	4	0.2		NR	$\triangle$(S-P) = 1.7°
		e			15.9		0.3			
	E	eS			28.0		0.4			
10 Apr		eP	19	23	53.0	3	0.8		T	
10 Apr		eP'	19	59	11.0	3	1.0		T	0.2 S 132.9 E, h about
	LP	eSur	20	40	15					36 km. 0 = 19 40 15.9
										Near coast of New Guinea
										Weak surface waves on LP
11 Apr		eP	18	02	04.0	1	0.2		NR	$\triangle$(S-P) = 1.7°
	E	eS			26.0		0.3			

DATE	Syst.	Phase	Arrival Time G.C.T.			Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h.	m.	s.					
11 Apr		eP	18	30	43.2	2	0.8		R	Strong surface on SP;
		e		32	43.0		1.2			Weak surface on BB and LP
		e		33	09.0		1.0			
	N	eSur		34	15.8		1.2			
	LPE	eSur			40					
	BBE	eSur		35	05					
11 Apr		eP'	18	51	47.6	2	0.9		T	8.8 S 117.4 E, h about
										182 km. 0 = 18 32 45.0
										Near south coast of Soembawa
										Island
11 Apr		eP	18	55	17.6	3	0.8		T	
11 Apr		eP	20	39	34.0	4	0.7		T	50.0 N 128.6 W, h about
										25 km. 0 = 20 33 48.9
										North of Vancouver Island
12 Apr		eP	04	00	47.2	3	0.7		T	
12 Apr		eP'	09	12	47.3	4	1.2		T	8.2 S 119.7 E, h about
										242 km. 0 = 08 53 50.1
										Near Flores Island
12 Apr		eP	10	49	04.6	2	0.8		T	18.8 N 67.3 W, h about
										74km. 0 = 10 42 43.8
										Mona Passage
12 Apr		eP	11	43	45.5	6	0.8		T	6.9 N 73.5 W, h about
										35 km. 0 = 11 36 44.1
										Central Columbia
12 Apr		eP	15	14	04.6	2	0.7		T	45.9 N 149.4 E, h about
										25 km. 0 = 15 02 00.1
										Kurile Islands
12 Apr		eP	16	07	26.4	2	0.9		T	
		e			32.6		0.8			
12 Apr		eP'	17	36	50.5	3	0.4		T	0.3 N 123.8 E, h about
										122 km. 0 = 17 17 55.3
										Northern Celebes

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
12 Apr		eP	17	39	25.1	35	1.4		T	48.1 N 154.7 E, h about
		e			36.9		1.3			42 km. 0 = 17 27 46.5
		e			59.2		1.0			Kurile Islands
		e		41	40.7		0.8			
12 Apr		eP	17	39	39.4	7	0.6		T	Possibly PcP of preceding
		e			48.5		0.4			event
12 Apr		eP	17	54	53.3	1	0.8		T	
12 Apr		eP	18	03	25.6	2	0.4		NR	△(S-P) = 1.7°
		eS			47.1	999				
12 Apr		eP	19	00	31.8	2	1.0		T	
12 Apr		eP	19	18	24.4	2	0.9		T	
12 Apr		eP	19	54	49.5	2	0.5		NR	△(S-P) = 2.5°
	N	eS		55	20.2		0.6			
12 Apr		eP	20	45	42.6	999		NE	NR	△(S-P) = 1.7°
		eS		46	03.6	999				
12 Apr		eP	22	11	53.6	999		NE	L	△(S-P) = 0.1°
		eS			56.0	999				
12 Apr		iP	22	25	32.9	c 999			T	13.1 N 88.9 W, h about
	BB	e			50		5.0			122 km. 0 = 22 20 33.6
		eSur		29	30.7		1.4			El Salvador. Mag. 5-3/4 -
	BB	e(S)			35	999				6 (Pas)
	BB	eSur		30	12	999				
		iPcS		32	52.4		1.0			LP inoperative
		e		33	19.0		1.0			
	BBE	eScS		36	32		8.0			Strong surface waves on
	N	e			43.1		1.3			BB, IB and SP
	N	e			58.2		1.3			
		e		40	31.2		4.5			
	BBE	e		50	36		22.0			
12 Apr		eP	22	37	03.6	7	0.8		T	Possibly phase of preceding event.

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
12 Apr		eP	22	43	39.2	4	0.5	SE	T	
12 Apr		eP	22	54	43.2	2	0.9		T	
12 Apr		eP	22	59	03.1	17	1.4		T	
12 Apr		eP	23	08	52.5	5	1.0		T	
		e		15	31.3		1.3			
13 Apr		eP	00	07	37.1	3	0.3		NR	△(S-P) = 1.7°
		eS		07	58.4	999				
13 Apr		eP	06	27	20.8	1	0.6		T	
		e			43.5		0.6			
		e		28	02.0		0.8			
13 Apr		eP	06	32	23.6	2	0.8		T	Possibly phase of preceding
		e			45.2		1.0			event.
13 Apr		eP	06	42	16.5	2	0.8		T	
		e			23.2		0.7			
13 Apr		eP	10	41	59.7	1	0.7		T	
13 Apr		eP	13	08	37.2	6	1.2		T	
13 Apr		eP	16	48	54.5	2	0.7		T	40.1 N 77.8 E, h about
		e		52	16.0		2.0			19 km. 0 = 16 34 39.1
		e			44.0		1.4			Sinkiang, China
		ePP			57.6		1.2			
		e		53	57.8		1.0			LP system inoperative
		e		54	19.6		1.6			Weak surface waves on SP
		e		55	19.0		1.6			Strong surface waves on BB
		e(SKP)		56	11.7		2.0			
		e		57	24.9		1.0			Probably P diffracted
		e		59	13.1		1.2			at 16 48 54.5.
		ePKKP	17	04	27.4		0.9			
	BBE	eSur		24	27					
	BBE	eSur		33	23					
		eSur		37	00					
	BB	eSur		39	37					

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
13 Apr		eP	17	25	21.1	3	0.8		T	15.5 S 173.1 W, h about
		e		29	47.7		1.1			25 km. 0 = 17 12 36.4
										Samoa Islands region
13 April		eP	20	27	27.8	4	1.0		T	39.6 N 77.8 E, h about
										61 km. 0 = 20 13 21.9
										Sinkiang Province, China
13 Apr		eP	21	16	15.9	4	0.3		NR	39.7 N 100.0 W, h about
		e			35.4	999				25 km. 0 = 21 14 57.2
		e(S)		17	17.2		0.6			Kansas - Nebraska border
		e			46.2	999				
										Possibly 2 events
13 Apr		eP	23	53	51.1	6	1.1		T	27.9 S 67.3 W, h about
		ePcP		54	15.6		1.0			219 km. 0 = 23 43 04.7
		e(pP)			36.0		0.8			Tucuman Province,
										Argentina
14 Apr		eP	04	36	15.9	1	0.6		T	
14 Apr		eP	06	47	21.2	3	1.0		T	
14 Apr		eP	08	46	22.6	3	1.0		T	
14 Apr		eP	15	18	51.3	9	1.0	NW	T	
14 Apr		eP	19	17	21.0	2	0.8		T	
		e			33.4		0.8			
		e			45.0		1.0			
15 Apr		eP	00	23	27.7	2	0.7		T	
15 Apr		eP	00	23	40.2	6	0.9	SE	T	Possible phase of preceding event.
15 Apr		eP	00	27	44.7	2	1.0		T	34.3 N 141.6 E, h about
										100 km. 0 = 00 14 49.2
										Off east coast of Honshu, Japan.
15 Apr		eP	00	42	01.0	4	1.2		T	

DATE	Syst	Phase	Arrival Time G C T h	m	s	Ground Motion A	T	Dir	Type	Remarks
1961										
15 Apr		eP	07	11	08.6	20	0.7		T	
		e			18.0		1.0			
15 Apr		eP	14	20	48.8	1	0.7		T	
15 Apr		eP	19	54	06.1	4	0.9		T	
		e			33.7		0.9			
15 Apr		eP	20	49	25.4	1	0.8		T	
		e			35.4		0.9			
15 Apr		eP	23	29	55.6	2	0.3		NR	Δ(S-P) = 1.7°
	E	eS		30	17.3	999				
15 Apr		eP	23	41	53.9	1	0.6		T	
16 Apr		eP	00	41	51.8	1	0.8		T	
16 Apr		eP	00	49	37.7	2	0.9		T	
16 Apr		eP	04	13	53.7	1	0.7		T	
16 Apr		eP	04	40	50.9	6	1.4		T	
16 Apr		eP	05	05	22.0	1	0.6	R		39.1 N 111.5 W, h about
		e		06	06.4		0.7			35 km. 0 = 05 02 39.3
	N	eSur		08	35.3		0.9			Central Utah
16 Apr		eP	07	38	51.4	2	1.0		T	
16 Apr		eP	09	48	18.4	2	0.9		T	
16 Apr		eP	10	28	21.5	3	0.9		T	
		e		30	48.9		0.9			
16 Apr		iP	11	51	51.3	c 66	0.7		T	53.5 N 158.7 E, h about
		e		52	26.8		0.8			27 km. 0 = 11 40 40.7
		ePP		54	25.1		1.4			Kamchatka
	E	eS	12	00	48.0		2.2			
		eP'P'		19	50.9		1.1			

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
16 Apr		eP	12	19	48.2	3	1.0		T	3.5 S 149.5 E, h about
		e		22	47.3		0.9			109 km. 0 = 12 05 53.8
	LP	eSur		56	50					New Ireland region
										Medium surface waves
										on LP
										P diffracted at 12 19 48.2.
16 Apr		eP	12	28	43.0	59	1.3		T	51.6 N 130.6 W, h about
	IB	e		29	26		2.8			50 km. θ = 12 22 47.1
		e		32	05.6		1.1			Off northwest coast of
		e		38	39.7		1.6			Vancouver Island.
	LPN	eSur		37	20					Medium surface waves
	LP	eSur		40	15					on LP and BB.
		eP'P'	13	03	04.2		1.1			Possible new event.
16 Apr		eP	21	14	22.4	3	0.7		T	
		e			37.4		0.8			
16 Apr		eP	22	28	17.0	2	0.8		T	
		e			31.6		0.9			
16 Apr		eP	22	47	10.6	2	0.9		T	
16 Apr		eP'	23	31	41.4	4	0.9		T	3.4 S 135.6 E, h about
										64 km. 0 = 23 12 52.2
										Near south coast of
										New Guinea
17 Apr		eP	01	06	23.3	3	1.0		T	
17 Apr		eP	02	43	39.3	2	0.8		T	31.8 S 69.8 W, h about
		e(PcP)			59.6		0.8			147 km. 0 = 02 32 28.2
										Central Chile - Argentina
										border
17 Apr		eP	04	25	00.9	4	1.0		T	
		e		27	07.4		1.0			
17 Apr		eP	04	49	39.8	5	1.0		T	20.1 S 178.1 W, h about
										644 km. 0 = 04 37 28.6
										Tonga Islands region

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
17 Apr		eP	07	57	48.0	5	1.1		T	16.0 S 175.3 W, h about
										289 km. 0 = 07 45 24.4
										Tonga Islands
17 Apr		eP	13	21	19.2	5	1.0		T	29.6 N 141.9 E, h about
		e		22	19.5		1.0			141 km. 0 = 13 08 10.8
										South of Honshu, Japan
17 Apr		eP	13	24	25.8	4	0.7		T	
17 Apr		eP	16	17	12.6	4	1.0		T	
17 Apr		eP	16	32	17.1	14	1.5		T	3.9 N 31.5 W, h about
		e			29.6		1.6			25 km. 0 = 16 21 10.2
		e		33	38.2		1.6			Mid Atlantic Ocean
		e			51.8		1.4			Medium surface waves
	LP	eSur		55	00					on LP
		eP'P'	17	00	31.5		1.4			
17 Apr		eP	20	30	38.7	5	0.7		T	
17 Apr		eP	20	45	20.5	11	0.9		T	20.8 S 68.5 W, h about
		e			38.3		0.7			200 km. 0 = 20 35 15.4
		e			53.3		1.0			Chile - Bolivia border
		e		46	34.5		1.0			
		ePP		47	31.0		1.4			
	BBN	eS		53	37		7.0			
17 Apr		eP	21	00	36.6	2	0.8		T	21.3 S 178.6 W, h about
										549 km. 0 = 20 48 12.5
										Tonga Islands region
17 Apr		eP	21	46	50.0	3	1.0		T	
17 Apr		eP	22	29	07.0	4	0.6		T	
17 Apr		eP	22	49	49.0	1	0.6		T	
18 Apr		eP	00	02	19.2	1	0.5		NR	Δ(S-P) = 3.5°
	E	eS		03	01.0		0.8			

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
18 Apr		eP	02	52	10.3	2	0.8		T	13.7 S 172.2 W, h about 60 km. 0 = 02 39 40.8 Samoa Islands
18 Apr		eP	05	40	03.2	2	0.6		T	
18 Apr		eP	08	39	02.6	3	0.6		T	44.6 N 150.1 E, h about 25 km. 0 = 08 26 54.8 Kurile Islands
		e			15.8		0.6			
18 Apr		eP	16	15	43.8	3	0.6		T	
18 Apr		eP	19	01	20.0	5	1.0		T	38.5 S 73.3 W, h about 30 km. 0 = 18 49 25.1 Near coast of southern Chile
		e		02	01.6		1.0			
18 Apr		eP	21	36	21.2	3	0.6		NR	$\triangle$(S-P) = 1.7°
	E	eS			42.7	999				
18 Apr		eP'	22	23	49.7	2	0.8		T	1.5 S 99.5 E, h about 39 km. 0 = 22 04 21.5 Off coast of Sumatra
18 Apr		eP	23	31	28.4	3	1.1		T	
19 Apr		eP	00	32	03.4	2	0.3		NR	$\triangle$(S-P) = 1.8°
		e			13.7		0.3	SSE		
	E	eS			26.0		0.4			
19 Apr		eP	01	44	05.8	13	0.9		T	
		e			26.8		0.6			
		e			30.0		0.8			
		e		48	03.6		0.7			
		e			34.1		0.9			
		e		49	02.3		0.7			
19 Apr		eP	03	01	28.3	3	0.9		T	
19 Apr		eP	04	05	50.7	3	0.9		T	
19 Apr		eP	04	50	30.7	1	0.9		T	

DATE	Syst.	Date	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
19 Apr		eP	11	13	56.3	1	0.8		T	18.8 S 67.4 W, h about 60 km. 0 = 11 03 45.9 Bolivia
		e		14	22.6		0.8			
		e		15	10.0		0.6			
19 Apr		eP	16	13	18.4	2	0.9		T	
		e			28.0		0.8			
19 Apr		eP	16	24	40.7	68	1.2		T	44.2 N 148.0 E, h about 51 km. 0 = 16 12 28.7 Kurile Islands
		e			47.6		1.1			
		e			57.2		0.9			
		e		26	55.0		1.0			Weak surface waves on LP
		ePP		27	50.0		1.5			
	N	eS		34	41.0		4.0			
	LPN	eS			46		21.0			
		ePKKP		43	02.5		0.9			
	LPN	eSur		47	50					
	LP	eSur		52	53					
19 Apr		iP	18	24	43.1	d 999			T	55.1 N 163.6 E, h about 21 km. 0 = 18 13 51.8 Kamchatka
		e			49.5		0.6			
		e			57.4		0.7			
	LPN	eS		33	34		24.0			Medium surface waves on LP
	LPN	eSur		48	05					
19 Apr		eP	19	47	30.5	1	0.7		T	
19 Apr		eP	20	31	52.7	7	1.0		T	44.6 N 150.2 E, h about 27 km. 0 = 20 19 46.4 Kurile Islands
		e		32	00.5		0.7			
		e			07.4		1.4			
	LPN	eSS		47	06		21.0			Weak surface waves on LP
	LPN	eSur	21	01	37					
19 Apr		eP	21	51	20.0	2	0.7		T	
19 Apr		eP	22	19	59.8	5	1.0		T	44.9 N 149.5 E, h about 34 km. 0 = 22 07 51.2 Kurile Islands
		e		20	08.8		1.1			
19 Apr		eP	23	29	53.5	2	0.2		NR	$\triangle$(S-P) = 1.7°
	E	eS		30	15.1		0.4			
20 Apr		eP	00	20	38.5	1	0.9		T	

DATE	Syst.	Phase	Arrival Time G.C.T.			Ground Motion A	T	Dir.	Type	Remarks
20 Apr		eP	00	35	51.9	1	0.9		T	
20 Apr		eP	00	44	37.5	1	0.6		R	
	N	eSur		46	13.8		0.7			
20 Apr		eP	01	24	07.3	1	0.6		T	
		e			56.7		0.5			
20 Apr		eP	02	24	45.9	1	0.6		T	
20 Apr		eP	05	23	28.5	4	0.8		T	
20 Apr		eP	05	56	00.9	6	0.9		T	50.0 N 155.4 E, h about 71 km. 0 = 05 44 34.7 Kurile Islands
20 Apr		eP	06	49	17.1	7	0.8	SE	T	
20 Apr		eP	07	01	38.5	1	0.2		R	
	E	eSur		03	15.8		0.5			
20 Apr		eP	14	26	33.7	8	0.9		T	54.7 N 159.6 E, h about 25 km. 0 = 14 15 27.7 Kamchatka
20 Apr		eP	18	25	55.6	999			L	Δ(S-P) = 0.1°
	E	eS			56.9		0.3	SE		
20 Apr		eP	18	36	46.5	4	0.9		T	
		e			59.1		0.9			
20 Apr	LPN	eSur	20	09	00				T	32.9 S 178.8 W, h about 58 km. 0 = 19 19 29.7 Kermadec Islands region. Weak surface waves on LP
20 Apr		eP	21	51	52.8	25	1.0		T	15.2 S 173.7 W, h about 25 km. 0 = 21 39 07.0 South of Samoa Islands Mag. 6 - 6-1/4 (Pas). Strong surface waves on LP Medium surface waves on BB
		e		52	04.2		1.0			
		e		53	37.5		1.2			
		ePP		55	26.4		1.3			
	IB	e	22	00	34		5.0			
	LPE	eS		02	28		14.0			
	LPE	ePPS		03	42		22.0			
	LP	eSur		19	14					

DATE	Syst.	Phase	Arrival Time G.C.T.			Ground Motion A	T	Dir.	Type	Remarks
1961			h.	m.	s.					
20 Apr		eP	23	11	09.0	4	0.2	WNW	L	Δ(S-P) = 0.4°
		eS			17.2	999				
21 Apr		eP	00	51	45.3	8	1.5		T	
21 Apr		eP	03	12	40.4		1.0		T	
21 Apr		eP	06	55	20.0	3	1.1		T	
		e			31.7		1.1			
21 Apr		eP	14	57	03.4	8	1.0		T	
21 Apr		eP	15	29	02.6	1	0.9		T	
21 Apr		eP	18	12	35.9	1	0.8		T	
		e		13	18.2		0.9			
21 Apr		eP	19	42	18.3	4	0.7		T	48.1 N 154.6 E, h about 23 km. 0 = 19 30 36.9 Kurile Islands. Medium surface waves on LP
		e			30.1		0.7			
	LP	eSur	20	09	00					
21 Apr		eP	20	22	20.6	14	0.8		T	47.7 N 154.6 E, h about 27 km. 0 = 20 10 38.3 Kurile Islands. Medium surface waves on LP Weak surface waves on BB
		e			33.4		1.5			
	LPE	e(PPP)		26	42		30.0			
	LPE	e(S)		32	05		28.0			
	LP	e		41	15		29.0			
	LPN	e		47	10		20.0			
	LP	eSur		49	15					
21 Apr		eP	21	36	13.5	3	0.6		T	51.7 N 173.9 W, h about 36 km. 0 = 21 26 42.1 Andreanof Islands, Aleutian Islands. Mag. 5-1/2 - 5-3/4 (Pal)
		e			26.9		1.4			
		e			47.2		1.2			
		e		37	00.8		2.0			
		e			13.8		1.4			
	LPN	eS		44	00		20.0			
	LPN	eSur		52	08					
	LP	eSur		56	20					
	LP	eSur		59	27					
21 Apr		eP	21	49	50.0	2	0.2		L	Δ(S-P) = 0.1°
	E	eS			54.1	999				

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
21 Apr		eP	22	01	39.2	6	1.0		T	
22 Apr		eP	00	49	26.9	3	1.0		T	Medium surface waves on LP
	LPN	eSur	01	17	30					
	LP	eSur		22	15					
22 Apr	LP	eSur	02	41	40				T	Weak surface waves on LP
22 Apr		eP	08	35	30.7	1	1.0		T	
22 Apr		eP	11	39	25.4	2	0.7		T	
		e		40	21.8		0.8			
22 Apr		eP	17	09	07.2	1	1.0		T	
22 Apr		eP	17	10	08.9	2	0.6		T	
22 Apr		eP	17	10	35.2	3	0.7		T	
22 Apr		eP	18	01	39.3	2	0.2		NR	Δ(S-P) = 1.7°
	E	eS		02	01.0	2	0.3			
22 Apr		eP	19	09	18.2	17	1.2		T	2.8 S 80.8 W, h about 30 km
		e			26.6		0.7			0 = 19 01 34.4 Near coast
		e			44.4		0.8			of Ecuador.
		e		10	41.0		1.0			Weak surface waves on LP
		ePP			55.3		1.5			
		ePcP		11	18.0		1.0			
		eScP		15	05.4		1.6			
	N	eS			29.4		2.6			
	LP	eSur		18	12					
		e			32.2		1.6			
	LP	eSur		23	42					
22 Apr	LP	eSur	19	51	00				T	3.5 S 150.1 E, h about 91 km 0 = 18 59 23.2 New Britain region. Medium surface waves on LP
23 Apr		eP	00	38	25.8	5	1.0		T	
23 Apr		eP	03	25	16.3	2	0.6		R	
	N	eSur		27	36.0		0.8			

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
23 Apr		eP	05	28	30.2	6	1.2		T	26.2 N 129.8 E, h about
		ePP		32	31.9		1.4			110 km. 0 = 05 14 31.1
	LPE	eSKKS		39	15		16.0			Ryukyu Islands.
	LPE	ePS		42	00		20.0			Weak surface waves on LP
		ePKKP		44	31.9		0.7			
	LPE	e		51	41		24.0			
	LPN	e		58	12		25.0			
	LP	eSur		59	15					
23 Apr		eP	09	13	45.5	25	1.1		T	44.6 N 150.2 E, h about
	LP	eP			48		13.0			44 km. 0 = 09 01 41.8
		e			57		1.7			Kurile Islands. Mag. 6-1/4
	IB	ePP		16	34		1.8			(Pas), 6-1/2 (Berk) (Pal)
	BB	e(PP)			54		6.5			
	IB	e			59		2.6			Possible new event at
	LP	ePPP		18	34		17.0			09 26 26.3
	E	eS		23	41.0		7.0			
	BBE	eS			43		9.5			Strong surface waves on LP
	LPE	eS			46		22.0			and BB
	LP	eSPP		24	41		22.0			Weak surface waves on
		e		26	26.3		1.3			IB and SP
	LPN	eSS		29	03		25.0			
		ePKKP		32	15.7		1.3			
	LPE	e			54		22.0			
	LPE	e		33	30		23.0			
	LPE	e		35	00		34.0			
	LPE	e		37	06		34.0			
		eP'P'		40	42.5		1.0			
	LPN	eSur		43	30					
23 Apr		eP	12	29	59.5	1	0.5		T	
	N	eSur		35	30.0		0.8			
23 Apr		eP	15	07	19.0	1	0.9		T	
23 Apr		eP	17	03	05.5	3	0.8		T	44.5 N 150.1 E, h about
		e			18.7		1.0			76 km. 0 = 16 51 03.6
	LPN	eS		13	04		20.0			Kurile Islands.
	LPN	eSS		18	25		19.0			Medium surface waves on
	LP	eSur		27	00					LP

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
23 Apr		eP	19	33	04.0	3	0.9		T	
23 Apr		eP	21	12	42.3	1	0.7		T	
24 Apr		eP	03	22	25.1	2	0.9		T	
		e			45.3		0.9			
24 Apr		eP	04	54	11.0	1	0.6		T	
24 Apr		eP	05	01	54.4	7	0.9		T	52.2 N 173.1 W, h about 57 km. 0 = 04 52 29.3 Fox Islands, Aleutian Islands.
		e		02	08.9		0.7			
24 Apr		eP	08	35	32.3	2	0.7		T	
		e			44.2		0.8			
24 Apr		eP	08	47	48.1	2	0.8		T	
24 Apr		eP	10	24	06.9	1	0.8		T	
		e			25.7		0.8			
24 Apr		eP	12	39	41.8	3	1.0		T	44.5 N 150.2 E, h about 76 km. 0 = 12 27 39.5 Kurile Islands Medium surface waves on LP
		e			54.7		0.9			
		e(PP)		42	52.8		1.1			
	LPN	eS		49	40		17.0			
	LPN	eSS		55	00		19.0			
	LPN	eSur	13	10	00					
24 Apr		eP	13	23	32.0	1	0.9		T	29.2 S 176.7 W, h about 25 km. 0 = 13 09 51.8 Kermadec Islands
24 Apr		eP	13	34	21.4	2	0.4		T	
24 Apr		eP	14	37	18.5	2	0.2		NR	Δ(S-P) = 1.7°
	E	eS			40.0		0.3			
24 Apr		eP	18	14	21.7	1	0.7		T	

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
24 Apr		eP	19	23	45.8	2	0.8		T	
24 Apr		eP	23	36	10.8	4	0.2		NR	Δ(S-P) = 1.7°
		e			20.2		0.4			
	N	eS			32.6	999				
25 Apr		eP	00	30	44.9	1	0.7		T	
25 Apr		eP	00	40	17.1	1	0.8		T	44.6 N 150.0 E, h about 72 km. 0 = 00 28 15.4 Kurile Islands
		e			44.0		1.0			
25 Apr		iP	01	13	58.5	c 28	0.6		T	14.4 N 90.1 W, h about 139 km. 0 = 01 09 16.2 Guatemala
		e		14	31.0		0.5			
		e			39.3		0.6			
	IB	e			41		1.1			
	N	eS		17	43.0		1.0			
		e(PcP)		18	06.5		1.1			
		e			45.9		1.1			
25 Apr		eP	01	29	42.2	3	0.8		T	44.5 N 150.0 E, h about 78 km. 0 = 01 17 42.7 Kurile Islands Medium surface waves on LP
		e			55.3		1.0			
		e(PP)		32	57.0		1.7			
	LPN	eS		39	43		20.0			
	LP	eSS		45	02		19.0			
	LP	eSur		51	00					
	LP	eSur	02	00	00					
25 Apr		eP	01	47	45.8	1	0.8		T	Possible PKKP of previous event
25 Apr		eP'	02	50	33.9	1	0.5		T	0.7 S 124.1 E, h about 200 km. 0 = 02 31 44.2 Northern Celebes region
		eSKP		53	43.1		0.8			
25 Apr		eP	05	15	19.5	2	0.8		T	
25 Apr		eP	07	30	27.3	1	0.9		T	
25 Apr		eP	08	20	44.4	1	0.8		T	
		e			54.3		0.9			

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
25 Apr		eP	09	49	10.1	4	0.9		T	8.7 N 70.7 W, h about
		ePP		50	38.2		1.1			74 km. 0 = 09 42 10.7
										Western Venezuela
25 Apr		eP	10	23	52.3	1	0.7		T	
25 Apr		eP	11	53	09.1	1	0.8		T	
25 Apr		eP	16	53	31.5	999	0.2		NR	△(S-P) = 1.7°
	E	eS			52.5		0.3			
25 Apr		eP	18	06	26.5	1	0.2		NR	△(S-P) = 1.7°
	E	eS		38	42.3		0.8			
25 Apr		eP	20	38	18.1	1	0.8		T	
		e			37.4		0.7			
25 Apr		eP	22	06	45.1	1	0.7		T	
		e			52.7		0.8			
25 Apr		eP	23	54	30.5	1	0.6		T	27.9 N 129.3 E, h about
										25 km. 0 = 23 40 34.3
										Ryukyu Islands
26 Apr		eP	00	50	28.8	1	0.6		T	
26 Apr		eP'	02	40	38.7	1	0.7		T	5.6 S 105.6 E, h about
										93 km. 0 = 02 21 10.5
										Southern Sumatra
26 Apr		eP	05	19	04.1	1	0.7		T	
		e			26.0		0.7			
26 Apr		eP	07	35	16.0	1	0.5		T	21.8 S 179.5 W, h about
		e		37	28.1		0.9			622 km. 0 = 07 22 52.2
										Fiji Islands region

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
26 Apr		eP	07	51	01.5	5	0.9		T	44.6 N 149.9 E, h about
		e			18.3		1.4			20 km. 0 = 07 38 54.1
	BB	e			34		9.0			Kurile Islands
		ePP		54	00.6		1.7			Mag. 6 (Berk) 5-3/4 - 6
	BBE	eS	08	01	00		10.0			(Pal)
	LPN	eSS		06	22		20.0			Strong surface waves on
	LPN	e		09	32		22.0			BB and LP
	LPN	eSur		14	30					
	LP	eSur		21	05					
26 Apr		eP	08	30	23.3	1	0.5		T	
		e			48.9		0.9			
26 Apr		eP	08	36	21.7	1	0.7		T	
26 Apr		eP	10	50	17.9	3	0.9		T	
26 Apr		eP'	12	05	14.0	1	0.6		T	25.2 N 95.4 E, h about
										217 km. 0 = 11 46 46.8
										India - Burma border
										region
26 Apr		eP	12	15	28.8	1	0.7		T	
26 Apr		eP	12	23	09.5	1	0.9		T	
		e			17.5		1.0			
26 Apr		eP	12	23	57.0	4	0.7	SE	T	
		e		24	10.9		0.7			
		eSur		27	51.4		1.2			
26 Apr		eP'	17	12	21.7	1	0.6		T	0.2 N 124.1 E, h about
										135 km. 0 = 16 53 29.4
										Northern Celebes
26 Apr		eP	19	44	38.2	5	0.8		T	44.6 N 150.1 E, h about
		e			51.8		0.8			51 km. 0 = 19 32 34.2
		ePP		47	53.4		1.2			Kurile Islands
	LPN	eS		54	40		20.0			Weak surface waves on LP
	LPN	eSS	20	00	00		20.0			
	LP	eSur		14	30					

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
26 Apr		eP	20	49	57.6	1	0.5		R	
	E	eSur		51	14.6		0.6			
27 Apr		eP	00	38	33.2	1	0.8		T	25.3 S 180 , h about
		e		40	27.4		0.8			504 km. 0 = 00 25 48.7
										South of Fiji Islands
27 Apr		eP	00	57	17.0	1	0.3		R	
		e			28.0		0.4			
	E	eSur		58	57.0		0.5			
27 Apr		eP	02	56	49.2	1	0.9		T	
27 Apr		eP	09	03	43.4	1	0.7		T	
27 Apr		eP	11	16	51.9	1	0.8		T	Weak surface waves on LP
	LP	eSur		39	00					
27 Apr		eP	17	14	39.9	2	1.0		T	
		e		15	03.8		1.0			
27 Apr		eP	18	00	48.4	2	0.8		T	
27 Apr		eP	18	01	20.0	49	1.5		T	12.9 S 75.1 W, h about
		epP			47.7		1.8			124 km. 0 = 17 52 16.5
		e			59.4		1.4			Peru
		e		02	09.6		0.9			Weak surface waves on LP
		ePcP			30.3		1.0			
		e			59.4		1.0			
		ePP		03	24.3		2.2			
		ePcS		06	21.4		1.0			
	N	eS		08	40.0		3.0			
	LPE	eSur		13	00					
	LP	eSur		18	30					
27 Apr		eP	18	28	53.4	1	0.8		R	
		eSur		31	27.8		0.5			
27 Apr		eP	18	34	32.2	7	0.7	NNE	T	
		e			45.0		0.6			
		e		38	44.4		0.8			

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
27 Apr		eP	19	34	07.3	4	0.2	NW	L	Δ(S-P) = 0.1°
	N	eS			11.3	999				
27 Apr		eP	20	37	29.3	1	0.7		T	
		e			42.1		0.7			
28 Apr		eP	01	07	11.2	1	0.8		T	36.3 N 121.6 W, h about
										41 km. 0 = 01 02 52.2
										Monterey County, California
										Mag. 4-1/4 (Pas), 4 (Berk)
28 Apr		eP	03	16	20.6	1	0.5		T	
28 Apr		eP	06	09	43.3	1	0.9		T	
28 Apr		eP	06	34	00.8	1	0.8		R	
	N	eSur		38	04.0		1.7			
28 Apr		eP	08	51	05.3	1	0.8		T	
		e			36.7		1.0			
28 Apr		eP	08	53	16.0	8	0.8		T	21.8 S 68.0 W, h about
		ePcP			47.0		0.9			132 km. 0 = 08 42 55.9
		ePP		55	34.3		1.0			Southern Bolivia
28 Apr		eP	13	16	00.1	2	1.0		T	
28 Apr		eP	14	11	14.1	11	1.0	SE	R	
		eSur		14	38.0		1.0			
28 Apr		eP	17	08	46.0	2	0.8		T	
28 Apr		eP	20	33	39.7	1	0.6		T	
28 Apr		eP	20	48	38.2	1	0.7		T	17.7 S 178.7 W, h about
										595 km. 0 = 20 36 25.3
										Fiji Islands
28 Apr		eP	21	22	46.3	5	1.2		T	
28 Apr		eP	22	53	57.6	5	0.7		T	

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
28 Apr		eP	23	28	38.6	2	0.4		NR	△(S-P) = 1.7°
	E	eS		29	00.0		0.4			
29 Apr		eP	00	47	43.8	3	0.7	SE	R	
		e		48	10.4		0.7			
	N	eSur		51	10.0		0.7			
29 Apr		eP	01	53	23.4	1	0.6		T	
		e			44.8		0.7			
29 Apr		eP	02	49	04.0	2	0.9		T	
29 Apr		eP	03	13	20.2	2	1.0		T	
29 Apr		eP	04	05	37.0	1	0.7		T	
29 Apr		eP'	07	03	40.8	1	0.8		T	49.8 S 126.8 E, h about 119 km. 0 = 06 44 15.6 About 1100 miles south of Western Australia
29 Apr		iP	09	24	41.4	c 999			T	40.6 N 127.5 W, h about 26 km. 0 = 09 19 28.3 Off coast of Northern California. Mag 5-1/2 - 5-3/4 (Pas), 5-1/2 (Berk), 5-1/2 - 5-3/4 (Pal) Strong surface waves on all systems
	LP	eP			44		16.0			
		e		24	49.0	999				
		e		26	01.8		1.2			
	BB	e(S)		29	02		999			
	N	e(S)			04.8		4.0			
	LPN	e		31	06		35.0			
	LPN	e			42		22.0			
		eScP		32	00.0		1.3			
		eSur		34	06.0					
29 Apr		eP	09	39	03.7	96	2.0		T	71.3 N 7.4 W, h about 14 km. 0 = 09 29 09.5 Jan Mayan Island region. Strong surface waves on LP and BB
		e			17.4		0.9			
	LPE	eSur		53	27					
	LPE	eSur		54	40					
	LP	eSur		57	50					
		eP'P'	10	08	52.0		1.6			
29 Apr		eP	09	58	05.8	3	1.0		T	

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
29 Apr		eP	10	27	25.4	1	0.4		T	
		e		29	22.0		0.7			
29 Apr		eP	11	13	39.0	1	0.5		R	30.0 N 114.4 W, h about 16 km. 0 = 11 10 19.7 Gulf of California Mag. 5-1/2 (Pas) Weak surface waves on LP, IB and BB
	N	eSur		17	50.0		1.6			
	LPN	eSur		32	10					
	LPN	eSur		41	20					
29 Apr		eP	11	55	32.0	29	1.8		T	
29 Apr		eP	12	49	19.0	4	1.2		T	
29 Apr		eP	15	07	17.9	9	1.4		T	
29 Apr		eP	15	34	45.0	2	1.0		T	
29 Apr		eP	16	22	30.8	1	1.0		T	
		e			46.3		1.1			
29 Apr		eP	16	56	47.0	7	1.2		T	
29 Apr		eP	17	06	06.8	27	1.9		T	
29 Apr		eP	17	15	31.8	4	0.7	SE	R	
		e			53.0		1.1			
		eSur		19	12.2		0.7			
29 Apr		eP	20	30	48.9	1	0.8		T	
29 Apr		eP	21	30	18.4	1	0.7		T	
29 Apr		eP	22	54	14.8	2	0.7		T	
29 Apr		eP	23	35	56.8	1	0.5		NR	△(S-P) = 3.6°
	N	eS		36	40.0		0.7			

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
29 Apr		eP	23	41	23.0	1	0.6		T	
30 Apr		eP	00	12	30.4	1	0.6		T	
30 Apr		eP'	00	30	10.0	54	1.6		T	49.6 **S** 117.0 E, h about
		e			47.0		1.6			25 km. 0 = 00 10 18.0
		e			37.8		2.0			About 950 miles south of Australia
30 Apr		eP	01	43	13.1	20	2.0		T	
30 Apr		eP	02	52	17.4	3	1.2		T	
30 Apr		eP	03	30	52.2	3	1.1		T	
30 Apr		eP	04	31	20.3	1	0.6		T	
30 Apr		eP	04	50	30.5	39	1.8		T	
	IB	e		52	17		3.0			
	LPN	e		58	06		23.0			
	LP	e	05	00	07		18.0			
30 Apr		eP	05	26	26.6	2	1.0		T	
30 Apr		eP	05	48	16.8	8	1.6		T	
30 Apr		eP	07	05	46.1	5	1.3		T	
30 Apr		eP	07	26	13.8	1	0.6		T	
30 Apr		eP	07	42	45.0	63	1.5		T	52.0 N 31.9 W, h about
		e			50.5		1.2			38 km. 0 = 07 33 53.5
		e(PcP)		44	07.0		0.7			North Atlantic Ocean
	BB	eS		49	56		8.0			Mag. 5-1/2 - 5-3/4 (Pal)
	LPN	eS		49	56		17.0			Strong surface waves on
		e(S)		50	01.2		2.0			LP and BB
		e		53	10.0		2.0			
	LPN	eSS			35		15.0			
	LP	eSur		58	15					
	BB	eSur	08	01	00					

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
30 Apr		eP	11	12	41.3	1	0.6		T	45.8 N 150.2 E, h about
		e			54.8		0.7			100 km. 0 = 11 00 46.8
										Kurile Islands
30 Apr		eP	11	27	22.1	7	1.1		T	44.6 N 149.7 E, h about
		e			36.8		0.8			70 km. 0 = 11 15 19.8
	LPN	eS		37	22		20.0			Kurile Islands
	LPN	eSS		42	42		20.0			Strong surface waves on LP
	LPE	eSur		46	00					Weak surface waves on BB
	LPE	eSur		57	00					
30 Apr		eP	12	46	55.6	2	1.0		T	
30 Apr		eP	14	17	29.5	1	1.0		T	Possible new event at
		e		19	06.1		2.2			14 19 06.1
		e		22	07.0		1.6			
	LPN	e		23	33		11.0			
	LPN	e		26	10		25.0			
	LP	e		28	36		17.0			
30 Apr		eP	15	01	00.2	19	1.2		T	15.3 **S** 174.4 W, h about
		e			28.4		1.2			25 km. 0 = 14 48 11.5
		e			55.9		1.4			Samoa Islands region.
		e(PP)		04	40.0		1.5			Strong surface waves on
	LPN	eS		11	45		20.0			LP and BB.
	LPE	eSS		17	35		15.0			
		ePKKP		18	56.6		1.2			
	LPN	e		21	10		20.0			
	LPE	eSur		24	10					
	LPN	eSur		29	00					

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
30 Apr		eP	17	35	49.4	15	1.1		T	40.7 N 127.2 W, h about
		e		36	30.4		1.1			44 km. 0 = 17 30 38.6
	LPE	eS		40	15		14.0			Off coast of Northern
		e			40.0		1.4			California
	LPN	eSur		42	53					
	LP	eSur		44	57					
30 Apr		eP	18	40	29.0	75	1.9	WNW	T	
		e			40.5		1.8			
		e		41	40.0		1.8			
	LPE	eS		44	56		10.0			
	LPN	eSur		47	34					
	LP	eSur		50	00					

WICHITA MOUNTAINS SEISMOLOGICAL OBSERVATORY
FORT SILL, OKLAHOMA, U.S.A.

Operated under the Technical Supervision of the
Air Force Technical Applications Center (AFTAC)

By

The Geotechnical Corporation, Garland, Texas

B. B. Leichliter, Chief Seismologist

REPORT ON THE REGISTRATION OF EARTHQUAKES FOR MAY 1961

Volume 1, No. 5

By Robert C. Shopland, Project Engineer;

Seismograms read by Gayle Stanfill and Cecil Morgan

Advanced Research Projects Agency (ARPA)
DEPARTMENT OF DEFENSE,
UNITED STATES GOVERNMENT

THE REGISTRATION OF EARTHQUAKES

AT THE

WICHITA MOUNTAINS SEISMOLOGICAL OBSERVATORY

STATION

Station Abbreviation: WMSO
Station Identification on Film Seismograms: a
Geographical Location*: 34° 43' 05.3" N. Lat.
(Vault No. 6) 98° 35' 20.7" W. Long.

GEOCENTRIC LOCATION*: 34° 32' 09.8" N. Lat.
(Vault No. 6) 98° 35' 20.7" W. Long.

ALTITUDE (Meters)*: 505 Meters (1658 feet)
(Vault No. 6)

GEOLOGY: The station is located on the Carlton (porphyritic) granophyre of the Wichita Mountains of Oklahoma.

NOISE LEVEL - May 1961: The periods of the predominant microseisms at WMSO are 0.5 second and 6 seconds. An amplitude distribution curve for the 0.5 second microseisms may be found on page 2.

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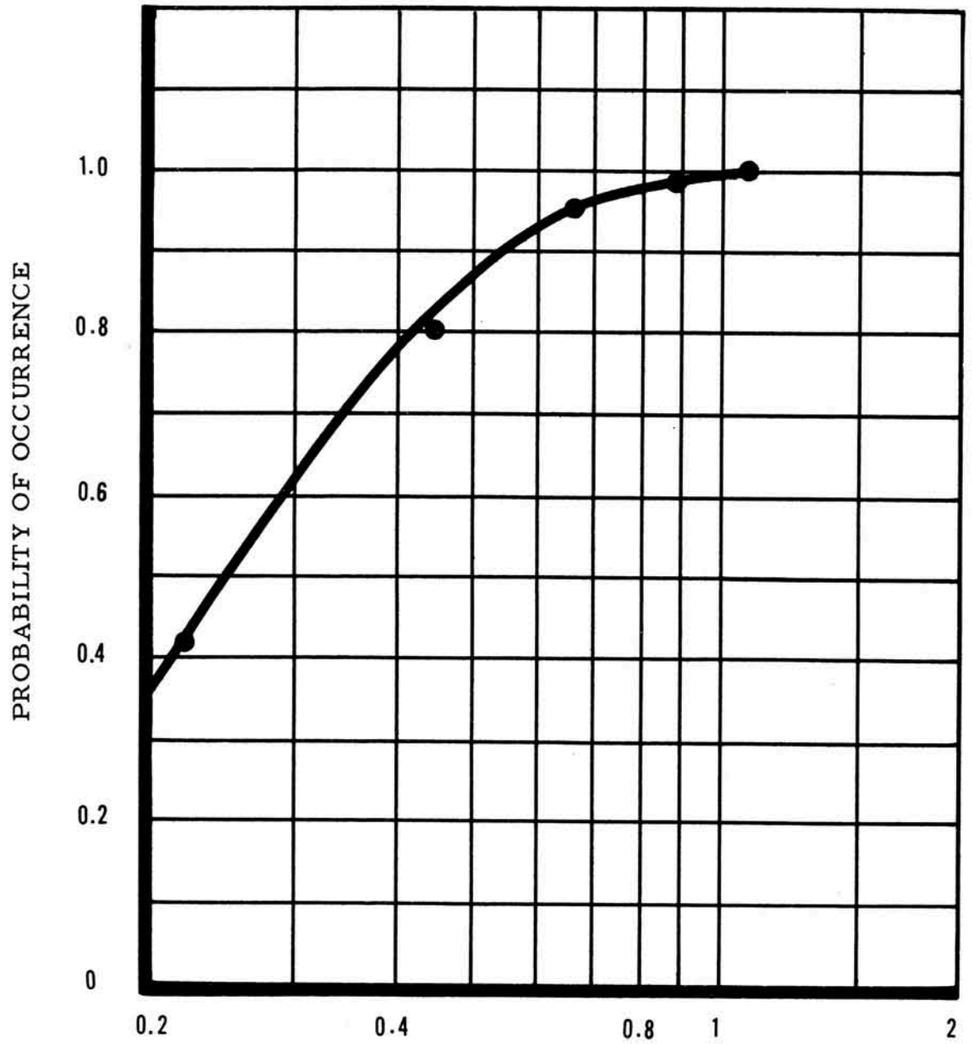
* The coordinates refer to the location of vault no. 6 which houses the 3-component groups of short-period and intermediate band seismometers from which arrival times are determined.



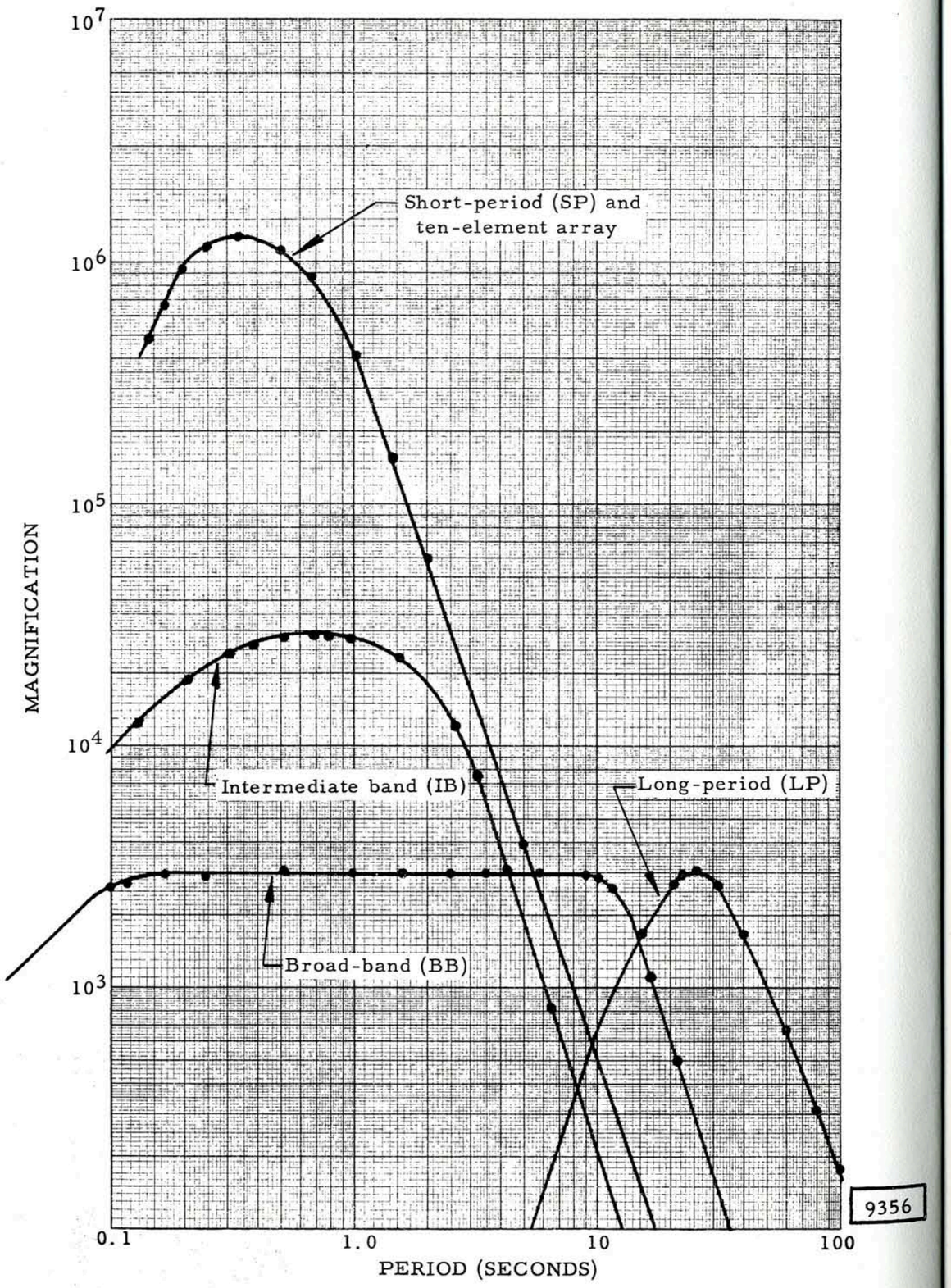
Probability of predominant 0.5-sec microseisms occurring at or less than a given amplitude at Unity magnification

SEISMOGRAPHS

	Ts	λs	Tg	λg	σ^2
SP Vertical Benioff	1.0	1.0	0.2	1.0	0.01
SP Horizontal Benioff	1.0	1.0	0.2	1.0	0.01
IB Vertical Melton	2.5	0.65	0.64	1.5	0.002
IB Horizontal Sprengnether	2.5	0.65	0.64	1.5	0.0005
BB Vertical Press-Ewing	12.5	0.4	0.64	9.0	0.0002
BB Horizontal Sprengnether	12.5	0.4	0.64	9.0	0.0004
LP Vertical Sprengnether	25.0	1.0	30	1.0	0.004
LP Horizontal Sprengnether	25.0	1.0	30	1.0	0.004

SP = Short Period
IB = Intermediate Band
BB = Broad Band
LP = Long Period
Ts = Free Period of seismometer in secs.
λs = Damping constant of seismometer
Tg = Free Period of galvanometer in secs.
λg_2 = Damping constant of galvanometer
σ^2 = Coupling Coefficient

NOTE: Response curves may be found on page 4.



Response characteristics of seismographs

INTERPRETATION OF SYMBOLS

1. Earthquakes Listed

All local (L), near-regional (NR), regional (R), and distant earthquakes (T) are tabulated on the following pages.

2. System

In the column headed "Syst." (system), the seismograph (SP, IB, BB, or LP) and component (Z, N, or E) used to measure arrival time are designated. When no component designation appears, the phase is read from the vertical component. When neither system nor component designation appears, the phase is read from the SP vertical component.

3. Phase

(1) "i" (impetus) preceding a phase designates sudden beginning of the motion. (A designation of "i" in the case of initial P motion indicates a signal-to-noise ratio exceeding about 5/1).
(2) "e" (emersio) designates gradual beginning.
(3) "i" or "e" alone designates an unidentified phase.
(4) ( ) (parenthesis marks) indicate uncertainty.

4. Time

(1) Date and arrival time are given in Greenwich Civil Time (G. C. T.)
(2) The arrival time is reported as the earliest time on Z, N, or E. Single Z rather than the array summation ($\sum$) is used for measuring arrival times on the SP seismographs.

5. Ground Motion

(1) In the columns headed "A" and "T" are tabulated earth displacement in millimicrons and period in seconds, respectively. An amplitude of 999 indicates that a signal cannot be measured reliably. A "c" or "d" in the "A" column indicates compression or dilation, respectively, of the ground as indicated by the vertical component instrument.

The value of "A" for P phases is the maximum amplitude in the first ten seconds. All amplitudes are center-to-peak amplitudes.

(2) Trace amplitudes are measured to the nearest 1/2 millimeter at X10 view.

6. Direction

In the column headed "Dir." (direction), the direction of the epicenter as viewed from WMSO is indicated. For teleseisms, direction is obtained only from P and Rayleigh waves and is listed opposite the phase from which it is obtained. For close events, direction may be obtained from P-wave step-out shown on the individual short-period vertical traces.

7. Type

Earthquakes are identified as either:

L	(local) - - - - - - - - - - - -	0°	- 1.4°
NR	(near-regional) - - - - - -	1.4°	- 6°
R	(regional) - - - - - - - -	6°	- 16°
T	(teleseismic) - - - - - - - -	16°	- 180°

8. Remarks Column

(1) Epicentral locations, time of origins, depth of foci, and magnitudes are obtained from the U.S. Coast and Geodetic Survey Preliminary Determination of Epicenters cards.

(2) The nature of the surface waves is indicated subjectively.

(3) Epicentral locations and distances reported by the station are accompanied by an indication of the phases used to determine epicentral distance, e.g. $\triangle$ (S-P) = 6°, Central Colorado.

(4) Operational notes refer to operational difficulties that affect analysis of data.

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
01 May		eP	00	55	10.6	2	0.8		T	36.2 N 141.1 E Near coast of Honshu, Japan h about 136 km 0 = 00 42 16.0
01 May		eP	01	28	32.8	2	0.8		T	
01 May		eP	02	46	54.0	25	1.5		T	40.6 N 127.6 W
	LPE	eS		51	20		11.0			Off coast of northern
	LPN	eSur		54	00					California
		e			38.4		1.2			h about 32 km
	LP	eSur		56	25					0 = 02 41 39.4 Weak surface waves on LP, BB, and IB
01 May		eP	02	55	59.0	64	1.5		T	40.5 N 127.4 W
		e		56	12.2		1.1			Off coast of northern
		e		57	12.6		1.4			California
		e		59	07.6		1.0			h about 51 km
	LPE	eS	03	00	30		12.0			0 = 02 50 48.8
	LPN	eSur		03	10					Medium surface waves on LP and BB
	LPE	eSur		05	08					Weak surface waves on SP
01 May		eP	03	04	46.0	6	1.4	NW	T	
01 May		eP	03	29	04.1	10	1.3		T	40.6 N 127.5 W
		e			10.7		1.4			Off coast of northern
		e			53.0		1.2			California
	LPN	eSur		36	40					h about 25 km
	LPE	eSur		38	25					0 = 03 23 51.3 Weak surface waves on LP and BB
01 May		eP	03	58	00.2	1	0.7		T	18.7 S 174.3 W Tonga Islands region h about 25 km 0 = 03 45 04.1

DATE	Syst.	Phase	Arrival Time G.C.T.	Ground Motion A	T	Dir.	Type	Remarks
1961			h. m. s.					
01 May		eP	05 35 33.7	2	0.8		T	
		e	43.0		0.8			
01 May		eP	07 26 35.6	554	3.1		T	40.7 N 127.4 W
	LPE	eS	31 02		13.0			Off coast of northern
	LPN	eSur	33 32					California
	LPE	eSur	35 43					h about 54 km
								0 = 07 21 26.2
								Strong surface waves
								on LP and BB
								BBZ inoperative
01 May		eP	07 57 14.6	1	0.6		T	45.4 N 149.6 E
		e	28.3		0.6			Kurile Islands
								h about 25 km
								0 = 07 45 09.6
01 May		eP	09 50 43.7	6	1.2		T	
01 May		eP	10 12 34.6	18	1.6	WNW	T	Weak surface waves
		e	45.8		1.6			on LP
	LPN	eSur	20 00					
	LPE	eSur	22 00					
01 May		eP	12 24 19.4	155	2.0		T	40.6 N 127.5 W
	LPE	eS	28 47		14.0			Off coast of northern
	LPN	eSur	30 35					California
	LPE	eSur	33 00					h about 29 km
								0 = 12 19 05.6
								Strong surface waves
								on LP and BB
								BBZ inoperative
01 May		eP	12 58 18.8	2	0.8		T	
01 May		eP	13 02 17.4	5	1.1		T	Possible phase of previous event
01 May		eP	14 33 55.6	3	1.0		T	

DATE	Syst.	Phase	Arrival Time G.C.T.	Ground Motion A	T	Dir.	Type	Remarks
1961			h. m. s.					
01 May		iP	18 11 35.2	c 999		NE	L	△(S-P) = 0.1°
		eS	38.0	999				
01 May		eP	18 50 37.2	192	2.0		T	40.7 N 127.3 W
		e	57.8		2.6			Off coast of northern
		e	54 24.0		2.0			California
	LPE	eS	55 05		14.0			h about 69 km
	LPN	eSur	57 00					0 = 18 45 28.9
	LPE	eSur	19 00 00					Strong surface waves on
								LP and BB
01 May		eP	21 35 08.3	8	1.2		T	40.7 N 126.5 W
		e	13.6		1.6			Off coast of northern
								California
								h about 16 km
								0 = 21 30 02.3
								LP system inoperative
01 May		eP	23 24 56.8	14	0.2	NW	L	△(S-P) = 0.5°
	E	eS	25 05.6	999				
02 May		eP	00 59 37.3	2	0.8		T	
		e	01 06 37.2		1.1			
02 May		eP	01 34 10.6	68	2.0		T	40.9 N 127.3 W
		e	21.6		1.3			Off coast of northern
		e	35 03.8		1.6			California
	LPN	eSur	41 50					h about 29 km
	LPE	eSur	43 40					0 = 01 28 59.1
								Weak surface waves
								on LP
02 May		eP	01 42 51.1	4	1.0		T	17.3 S 178.7 W
								Fiji Islands region
								h about 608 km
								0 = 01 30 42.1
02 May		eP	03 21 40.5	5	1.0		T	71.2 N 6.9 W
		e	22 01.4		2.0			Jan Mayen Island region
		e	25 25.0		1.0			h about 22 km
	LPE	eSur	40 08					0 = 03 11 45.7
	BB	eSur	46 24					Weak surface waves on
								LP and BB

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
02 May		eP	10	15	41.4	58	2.2		T	40.7 N 127.2 W
		e			48.4		1.6			Off coast of northern
		e		16	01.6		1.4			California
		e		18	00.0		1.5			h about 36 km
	LPE	eS		20	10		10.0			0 = 10 10 32.3
	LPN	eSur		22	47					Strong surface waves
	LPN	eSur		23	15					on LP and BB
	BB	eSur		25	05					
02 May		eP	11	23	06.5	7	0.4		T	16.0 N 93.1 W
										Southern Mexico
										h about 68 km
										0 = 11 18 45.2
02 May		eP	11	26	20.0	5	0.4		T	Possible phase of Mexico event
02 May		eP	11	30	10.0	1	0.6		T	44.3 N 149.5 E
										Kurile Islands
										h about 25 km
										0 = 11 17 59.7
02 May		eP	12	22	54.6	9	1.6		T	
		e		23	22.8		1.5			
02 May		eP	15	01	10.4	11	0.9		T	
		e		05	16.4		1.1			
		e		06	17.4		1.1			
02 May		eP	18	05	09.6	1	0.4		NR	$\triangle$(S-P) = 1.7°
		e			19.3		0.4			
	E	eS			31.4		0.4			
02 May		eP	19	03	35.4	32	1.0		T	15.2 S 173.1 W
		e			48.3		1.2			Samoa Islands region
		e			59.0		1.0			h about 71 km
	LPE	eSur		31	20					0 = 18 50 57.5
										Weak surface waves
										on LP

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
02 May		eP	19	51	36.5	2	0.9		T	27.8 S 176.4 W
	LPN	eSKS	20	02	25		15.0			Kermadec Islands region
	LPE	e(S)		03	15		19.0			h about 53 km
	LPE	eSS		09	42		20.0			0 = 19 38 13.5
	LPE	eSur		20	00					Medium surface waves
	LPN	eSur		27	00					on LP and BB
02 May		eP	19	52	56.1	2	0.8		T	27.5 S 176.7 W
	LPN	eSKS	20	03	48		15.0			Kermadec Islands region
	LPE	eS		04	36		18.0			h about 77 km
										0 = 19 39 38.2
										Surface waves present
										but cannot separate from
										previous event
02 May		eP	22	43	06.2	70	1.7		T	40.8 N 127.0 W
		e		44	08.7		2.1			Off coast of northern
	LPE	eS		47	35		11.0			California
	LPN	eSur		49	32					h about 22 km
	LP	eSur		52	15					0 = 22 37 55.5
										Strong surface waves on
										LP and BB
02 May		eP	22	58	13.2	197	2.4		T	27.8 S 176.5 W
		e			29.4		1.3			Kermadec Islands region
		e		59	17.5		1.0			h about 47 km
		ePP	23	02	05.0		2.0			0 = 22 44 44.3
	LPN	eSKS		08	51		18.0			Mag. 6-3/4 (Pas)
	N	eS		09	22.0		2.5			6-1/4-6-1/2 (Berk)
	LPE	e(SKKS)			47		20.0			6-1/4 (Pal)
	LPN	ePS		11	00		22.0			Very strong surface waves
	LPN	ePPS			41		23.0			on all systems
		ePKKP		15	02.2		0.8			
		e			14.5		1.1			
		e			39.4		1.2			
		e			42.4		0.8			
	LPE	eSS		16	09		20.0			
		e			43.2		1.4			

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
		ePKKS		18	26.0		2.5			(continued from
	LPN	e(SSS)		19	48		24.0			preceding page)
	LPE	eSKKS		21	50		20.0			
	LP	e(PPP)		23	10		23.0			
		eP'P'			13.6		1.4			
	BB	e			42		5.0			
	LPE	eSur		24	38					
	LPE	e(SKKKS)		26	35		23.0			
	BB	eSur		27	10					
	LP	eSur		30	00					
		eSur		36	00					
02 May		eP	23	37	27.1	8	1.2		T	27.7 S 176.4 W Kermadec Island region h about 84 km 0 = 23 24 03.6
03 May		eP	00	12	43.0	4	1.2		T	
03 May		eP	00	34	35.7	9	1.4		T	
03 May		eP	00	37	58.0	60	2.0		T	1.0 N 26.4 W Mid-Atlantic Ocean h about 25 km 0 = 00 26 17.0
		e		38	07.0		0.6			
		e		40	40.6		1.7			
03 May		eP	08	54	07.9	18	1.6		T	40.6 N 127.6 W Off coast of northern California h about 25 km 0 = 08 48 52.9 Medium surface waves on LP and BB
		e			15.1		1.8			
		e			37.7		1.4			
	LPE	eS		58	35		12.0			
	LPN	eSur	09	01	12					
	LP	eSur		03	17					
03 May		eP	09	18	53.7	1	0.6		T	
03 May		eP	09	31	21.1	4	1.0		T	
		e			31.9		1.8			

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
03 May		eP	10	04	58.5	1	0.8		T	
03 May		eP	12	25	50.8	1	0.4		T	51.7 N 168.3 W Fox Islands, Aleutian Islands h about 47 km 0 = 12 16 46.7
03 May		eP	14	07	06.4	10	0.8		T	17.7 N 103.1 W Near coast of Mexico h about 20 km 0 = 14 03 03.5 Strong surface waves on all systems
		e		09	03.4		1.1			
		e		10	55.8		1.0			
		Lg		12	00.2		4.0			
	BB	e		13	40		10.0			
03 May		eP	17	07	40.0	1	1.0		T	27.8 S 176.1 W Kermadec Islands region h about 49 km 0 = 16 54 11.4
03 May		eP	17	16	31.2	3	1.0		T	27.9 S 176.4 W Kermadec Islands region h about 60 km 0 17 03 06.2 Weak surface waves on LP
	LPN	eSur		42	30					
03 May		eP	22	41	15.0	2	0.6		T	
03 May		eP	23	33	10.4	3	0.2		NR	$\triangle$(S-P) = 1.8°
	E	eS			32.5	999				
04 May		eP	02	22	44.9	103	1.8		T	40.6 N 127.1 W Off coast of northern California h about 25 km 0 = 02 17 34.0 Strong surface waves on BB and LP Weak surface waves on IB and SP
		e		23	28.2		1.6			
		e		24	00.0		2.2			
	LPE	eS		27	12		14.0			
		e			33.0		1.6			
		e		28	03.2		1.4			
	LPN	eSur		29	13					
	LP	eSur		30	50					

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
04 May		eP	03	45	14.5	11	1.0		T	17.9 S 178.5 W Fiji Islands region h about 601 km 0 = 03 33 03.5
04 May		eP	06	55	21.1	5	0.8		T	
		e		56	46.3		1.6			
04 May		eP	07	09	22.5	24	1.4		T	17.7 N 46.4 W Atlantic Ocean
		e			41.3		1.2			
		ePcP		10	45.9		1.0			h about 19 km
	BB	eSur		25	56					0 = 07 00 32.8 Medium surface waves on BB LP system inoperative
04 May		eP	07	24	28.3	3	0.9		T	
04 May		eP	14	45	33.3	2	0.6		T	
04 May		eP'	15	42	45.8	2	0.8		T	0.6 S 98.8 E Near coast of Sumatra h about 41 km 0 = 15 23 17.3
04 May		eP	17	01	35.2	8	1.1		T	
04 May		eP	20	28	34.2	10	1.0		T	5.1 S 81.0 W
		e			44.8		1.0			Near coast of northern Peru
		ePcP		30	23.3		0.6			h about 49 km 0 = 20 20 36.5
04 May		eP	20	41	47.0	32	1.8		T	
04 May		eP	20	56	51.6	82	2.5		T	Weak surface waves on BB
		e		57	32.1		1.7			LP system inoperative
	BB	eSur	21	06	18					

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
04 May		eP	21	04	19.0	109	1.8		T	40.6 N 127.5 W
		e			49.6		1.3			Off coast of northern
		e		05	40.0		2.8			California
	BB	eSur		13	44					h about 67 km 0 = 20 59 08.8 Medium surface waves on BB LP system inoperative
04 May		eP	23	52	15.5	1	0.6		T	
05 May		eP	05	47	21.8	4	1.2		T	
05 May		eP	06	52	30.4	1	1.0		T	27.7 S 176.4 W
	LP	eSur	07	27	00					Kermadec Islands region h about 84 km 0 = 06 39 07.9 Weak surface waves on LP
05 May		eP	07	41	13.4	2	0.8		T	
		e			26.8		0.8			
		e		43	51.0		1.0			
05 May	LP	eSur	09	32	00				T	27.3 S 176.4 W Kermadec Islands region h about 42 km 0 = 08 44 15.7 Medium surface waves on LP and BB
05 May		eP	12	07	33.3	26	1.8		T	
05 May		eP	13	13	02.5	66	1.8		T	40.5 N 127.1 W
		e			13.1		1.8			Off coast of northern
	LPN	eS		17	28		12.0			California
	LPN	eSur		20	10					h about 36 km
	BB	eSur		22	31					0 = 13 07 53.3 Strong surface waves on LP and BB

DATE	Syst.	Phase	Arrival Time G.C.T.			Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h.	m.	s.					
05 May		eP	13	56	43.5	4	1.0		T	27.8 S 176.1 W
		e			58.9		1.0			Kermadec Islands region
	BBE	e(SKS)	14	07	27		10.0			h about 84 km
	LPE	e(S)		08	13		18.0			0 = 13 43 21.1
	BB	ePS		09	20		9.0			Strong surface waves
	LPE	ePPS		10	00		20.0			on LP and BB
	LPE	e(SS)		14	45		25.0			Weak surface waves on
	LPE	eSKKS		20	30		22.0			SP and IB
	LPN	e		24	50		25.0			Mag. 6-1/4 (Pas)
	BBN	eSur		26	15					
	LP	eSur		30	57					
05 May	LP	eSur	16	03	15				T	27.3 S 176.1 W
										Kermadec Island region
										h about 60 km
										0 = 15 28 50.7
										Weak surface waves on LP
05 May		eP	18	01	10.0	1	0.6		T	
05 May		eP	21	00	24.0	3	1.0		T	28.2 S 177.4 W
	LP	eSur		35	00					Kermadec Islands region
										h about 600 km
										0 = 20 47 48.6
										Weak surface waves on LP
06 May		eP	01	13	16.4	3	0.3		NR	$\triangle$(S-P) = 2.2°
	N	eS			43.6		0.5			
06 May		eP	02	14	34.2	1	0.6		T	
06 May		eP	02	52	00.8	6	1.4		T	
		e			20.7		1.4			
06 May		eP	03	28	44.9	2	1.0		T	
06 May		eP	03	42	36.3	5	1.3		T	

DATE	Syst.	Phase	Arrival Time G.C.T.			Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h.	m.	s.					
06 May		eP	04	05	15.2	5	0.9		T	20.1 S 68.5 W
		ePcP			53.6		0.5			Chile - Bolivia border
										h about 66 km
										0 = 03 55 01.2
06 May		e(P)	05	40	48.6	4	1.2		T	
		e		41	22.5		1.6			
06 May		eP	15	44	15.5	3	1.0		T	
06 May		eP	16	15	43.0	1	0.5		T	
06 May		eP	16	16	59.4	20	0.7		T	37.4 N 11.2 E
										Mediterranean Sea,
										Off coast of Tunisia
										h about 30 km
										0 = 16 04 33.1
06 May		eP	19	50	40.2	33	1.7		T	1.2 S 15.5 W
		e		51	05.7		1.4			Atlantic Ocean, north
		e			24.6		1.7			of Ascension Island
	LPE	eS	20	01	15		18.0			h about 24 km
	LPE	e(SS)		06	33		20.0			0 = 19 38 04.6
	LP	eSur		18	00					Strong surface waves
										on LP
										Weak surface waves on BB
06 May		eP	21	40	52.0	5	1.1		T	
06 May		eP	21	45	24.2	3	0.6		T	
06 May		eP	22	34	52.8	2	0.8		T	49.5 N 176.5 W
										Andreanof Islands,
										Aleutian Islands
										h about 20 km
										0 = 22 25 05.5

DATE	Syst.	Phase	Arrival Time G.C.T.			Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h.	m.	s.					
06 May		eP'	22	51	36.8	2	0.5		T	6.3 N 126.3 E
		e		52	03.8		0.9			Near coast of Mindanao,
		e			18.1		0.9			Philippine Islands
		e		55	48.6		0.9			h about 110 km
		ePKKP	23	01	36.5		0.7			0 = 22 32 49.7
		e		02	07.0		0.9			Medium surface waves
		e		05	35.0		1.0			on LP
	LPE	eSur		30	00					
06 May		eP	23	27	41.9	2	1.0		T	17.2 S 167.9 E
		ePP		31	25.0		1.2			New Hebrides Islands
	LPE	ePS		40	47		20.0			region
	LPE	ePPS		41	45		20.0			h about 96 km
		ePKKP		43	22.4		1.0			0 = 23 13 29.5
	LPN	e		46	47		24.0			Strong surface waves
	LPE	e		56	45		30.0			on LP and BB
07 May	LP	eSur	00	01	15					
	BB	eSur		07	45					
07 May		eP	00	39	53.5	4	1.2		T	6.1 S 154.4 E
		e		42	52.8		1.3			Solomon Islands region
		ePP		44	09.5		1.6			h about 123 km
	LP	ePP			18		19.0			0 = 00 25 40.8
		e			32.6		1.6			Mag. 6-1/2 - 6-3/4 (Pas)
		e(SKP)		47	19.8		1.2			Weak surface waves on SP
		e		48	47.2		1.6			and IB.
	LP	e		53	42		20.0			Strong surface waves on
	LPE	ePPS		54	35		20.0			BB and LP
	LPE	e		55	00		22.0			
		$ePKKP_1$			11.7		1.0			
		$ePKKP_2$			28.5		1.1			
		$ePKKP_3$			40.0		1.1			
	LP	e		57	25		20.0			
	LPE	e	01	00	05		35.0			
	LP	e		03	19		20.0			
	LPE	e			47		40.0			
	LPE	e		07	40		30.0			
	LP	eSur		15	47					
		eSur		20	30.0					

DATE	Syst.	Phase	Arrival Time G.C.T.			Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h.	m.	s.					
07 May		eP	00	50	18.5	2	0.3	SE	NR	$\triangle$(S-P) = 2.1°
	N	eS			44.3		0.3			
07 May		eP	00	51	06.7	2	0.7		T	
		e			37.0		0.8			
07 May		eP	00	58	51.5	2	1.0		T	
		e		59	11.7		1.1			
07 May		eP	01	11	23.4	9	1.0		T	44.3 N 149.4 E
										Kurile Islands
										h about 37 km
										0 = 00 59 06.3
07 May		eP	02	07	18.1	2	0.7		T	8.3 N 38.0 W
		e			33.8		1.3			Atlantic Ocean
		e		08	26.8		0.9			h about 25 km
	LPN	eSur		25	05					0 = 01 57 02.4
	LP	eSur		27	15					Strong surface waves
										on LP
										Medium surface waves
										on BB
07 May		eP	02	54	10.5	14	1.5		T	8.2 N 38.1 W
	LPN	eSur	03	11	25					Atlantic Ocean
	LP	eSur		14	00					h about 46 km
										0 = 02 43 58.5
										Medium surface waves
										on LP
07 May		eP	04	26	22.5	8	1.0		T	20.0 N 108.9 W
		e			34.8		1.0			Revilla Gigedo Islands
	LPE	eS		29	45		16.0			region
	BBE	Lg		31	45		7.0			h about 20 km
		eSur			58.0		5.0			0 = 04 22 19.5
	BB	eSur		32	34					Strong surface waves
	BB	eScP		34	30		7.0			on BB
										Medium surface waves
										on LP, and weak surface
										waves on SP and IB

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
07 May		eP	04	49	29.1	21	1.4		T	Medium surface waves
		e		50	03.5		1.0			on LP
	LP	eSur	05	22	00					
07 May		eP'	04	51	34.9	13	0.6		T	8.6 S 111.4 E
		e		52	27.1		0.9			Near coast of Java
		e		54	24.2		1.0			h about 113 km
		ePP			44.5		1.1			0 = 04 32 14.5
		eSKS		58	30.0		2.0			
	LPE	e	05	00	36		13.0			
		e		03	28.2		1.2			
07 May		eP	06	08	13.2	31	1.5		T	40.6 N 127.0 W
		e			30.7		1.3			Off coast of northern
		e			55.0		1.3			California
	LPE	eSur		15	18					h about 32 km
	LP	eSur		17	40					0 = 06 03 03.3
										Strong surface waves
										on LP and BB
07 May		eP	08	40	45.1	12	1.5		T	
07 May		eP	08	59	52.3	1	0.5		R	
		e	09	00	14.1		0.8			
	E	eSur		03	33.5		0.6			
07 May		eP	09	06	41.6	14	1.6		T	40.6 N 127.8 W
										Off coast of northern
										California
										h about 25 km
										0 = 09 01 26.4
07 May		eP	10	38	24.4	1	0.7		T	5.8 N 126.8 E
		eP'		41	31.6	4	0.7			Off coast of Mindanao, P.I.
		e			54.1		1.3			h about 89 km
		e		42	10.0		0.7			0 = 10 22 43.7
	BB	ePP		43	01		8.0			Strong surface waves on
		e			31.2		1.3			LP and BB
										P diffracted at 10 38 24.4

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
		eSKP		44	50.3		1.4			(continued from preceding
		e		46	34.0		0.9			page)
	LPE	eSKS		48	30		13.0			
	LPE	e		49	08		13.0			
		$ePKKP_1$		51	31.2		0.8			
		$ePKKP_2$			33.6		1.0			
		$ePKKP_3$			55.2		0.9			
	LPE	ePS		52	45		19.0			
	LPE	e		53	38		21.0			
	LP	ePSP		54	16		20.0			
	LPE	e(PKKS)		55	45		21.0			
		e		57	19.4		1.2			
	LPE	eSS		59	56		25.0			
	LPE	e	11	04	10		23.0			
	LPE	e		10	24		25.0			
	LPN	eSur		13	47					
	LP	eSur		19	15					
07 May		eP	12	27	56.8	3	0.9		T	35.2 N 134.5 E
										Honshu, Japan
										h about 25 km
										0 = 12 14 15.5
07 May		eP	12	33	58.5	9	1.4		T	
07 May		eP	13	30	57.9	15	1.5		T	16.0 N 46.9 W
										Atlantic Ocean
										h about 39 km
										0 = 13 22 04.8
07 May		eP	15	31	40.5	27	1.5		T	
		e			55.6		2.0			
		e		32	23.6		2.0			
07 May		eP	15	50	47.7	2	0.8		T	71.2 N 7.1 W
		e			54.2		1.0			Jan Mayen Island region
										h about 66 km
										0 = 15 40 52.5

DATE	Syst.	Phase	Arrival Time G. C. T.			Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h.	m.	s.					
07 May		eP	16	24	17.5	93	1.9		T	40.4 N 127.2 W
		e			24.0		2.0			Off coast of northern
	BB	eSur		33	42					California
										h about 31 km
										0 = 16 19 05.9
										Strong surface waves
										on BB, LP inoperative
07 May		eP	18	53	31.8	1	0.5		R	
		eSur		56	40.0		0.5			
07 May		eP	19	43	00.0	2	0.9		T	
		e			06.0		0.6			
07 May		eP	20	39	38.0	2	0.8		T	
		e		40	09.6		0.8			
07 May		eP	21	41	38.2	5	1.3		T	
07 May		eP	22	06	53.8	2	0.8		T	56.4 N 155.8 W
		e		07	10.0		0.9			Near Kodiak Island,
										Alaska
										h about 25 km
										0 = 21 58 44.1
										LP inoperative
07 May		eP	23	05	38.8	4	1.0		T	
08 May		eP	02	05	36.8	8	0.6		T	31.3 S 67.4 W
		e			55.6		0.7			San Juan Province,
		e		06	47.6		1.1			Argentina
	LPN	eS		14	15		21.0			h about 84 km
										0 = 01 54 17.1
										LPZ inoperative
08 May		eP	07	07	24.4	2	1.0		T	
08 May		eP	08	37	32.5	1	0.6		T	

DATE	Syst.	Phase	Arrival Time G. C. T.			Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h.	m.	s.					
08 May		eP	08	59	31.7	18	1.6		T	
08 May		eP	12	11	44.0	7	0.6		T	
08 May		eP	12	48	52.8	48	1.6		T	41.0 N 127.3 W
		e		49	45.4		1.0			Off coast of northern
	LPN	eSur		55	25					California
	BB	eSur		58	28					h about 35 km
										0 = 12 43 43.4
										Medium surface waves
										on LP and BB
										LPZ inoperative
08 May		eP	14	03	01.6	49	2.0		T	Weak surface waves on
	BB	eSur		12	37					BB and LP
										LPZ inoperative
08 May		eP	14	28	56.0	28	0.7	SE	T	
		e		29	17.2		1.0			
		e		33	06.1		1.3			
08 May		eP	18	05	37.0	1	0.4		NR	$\triangle$(S-P) = 1.7°
	E	eS			58.9	999				
08 May		eP	18	41	01.4	2	0.8		T	10.8 S 75.1 W
		e			29.8		1.0			Peru
										h about 60 km
										0 = 18 32 03.5
08 May		eP	19	34	12.6	64	1.6		T	24.3 S 69.7 W
		ePP		36	33.2		2.1			Northern Chile
		e		37	20.8		1.6			h about 48 km
	BBE	eS		42	50		8.0			0 = 19 23 35.4
		e(SP)		43	00.2		1.6			Mag. 5-1/2 - 5-3/4 (Pal)
	BBE	eScS		44	06		6.0			Strong surface waves
	BBE	e(SS)		47	05		5.0			on LP
	LPN	eSur		50	35					Weak surface waves on BB
	BB	e	20	03	03		6.0			LPZ and LPE inoperative
	BB	eSur		09	30					

DATE	Syst.	Phase	Arrival Time G.C.T.			Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h.	m.	s.					
08 May		eP	21	31	52.8	2	0.7		NR	△(S-P) = 1.7°
		eS		32	14.1	999				
08 May		eP	22	39	34.4	14	1.5		T	
08 May		eP	22	57	58.4	2	0.6		T	43.8 N 11.8 E Italy h about 21 km 0 = 22 45 50.0
08 May		eP	23	02	35.3	1	0.7		T	
08 May		eP	23	14	10.4	5	1.3		T	
08 May		eP	23	17	56.4	2	0.8		T	
09 May		eP	00	04	03.2	62	1.0	NW	T	
		e			31.0		1.0			
		e		07	14.8		1.5			
	LPN	e(S)		08	51		20.0			
	LPN	eSur		11	05					
	LP	eSur		12	50			WNW		
09 May		eP	02	23	59.5	11	1.0	SSW	T	△(S-P) = 31.5° △(PP-P) about 34°
		e		24	16.1		1.1			
		e		25	03.3		1.2			Medium surface waves on BB
		ePP			12.9		1.8			
	LPE	eS		29	10		17.0			
	BB	eSur		30	25					
09 May		eP	07	10	58.5	16	1.4		T	
		e		14	07.2		2.2			
	LPN	e		18	30		21.0			
	LP	e		20	34		15.0			
09 May		eP	08	29	31.0	1	1.0		T	27.7 S 176.4 W Kermadec Islands region h about 84 km 0 = 08 16 08.2 Medium surface waves on LP and BB
		e			47.0		0.9			
	LP	eSur	09	04	15					

DATE	Syst.	Phase	Arrival Time G.C.T.			Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h.	m.	s.					
09 May		eP	09	31	19.6	2	0.6		T	
		e			38.2		0.8			
		e		32	27.9		1.1			
09 May		eP	10	28	18.0	1	0.6		T	
09 May		eP	11	08	04.0	1	0.6		T	
		e			14.2		0.7			
09 May	LP	eSur	12	01	50				T	Weak surface waves on LP
09 May		eP'	12	08	12.7	23	1.6		T	7.0 S 106.8 E Near coast of Java h about 81 km 0 = 11 48 54.8
		e(P'_2)			22.6	5	0.8			
09 May		eP	12	11	35.2	19	1.2		T	40.8 N 127.2 W Off coast of northern California h about 46 km 0 = 12 06 28.5 Strong surface waves on BB and LP
		e		12	20.4		1.3			
	BBE	eS		16	00		9.0			
	LP	e		17	47		17.0			
	LPN	eSur		19	10					
	BB	eSur		21	02					
09 May		eP	12	20	19.8	1	0.6		T	
09 May		eP	15	31	55.6	2	0.8		T	Surface may be separate
	LP	eSur	16	17	30					Weak surface waves on LP
09 May		eP	16	02	28.2	2	0.8		T	
09 May		eP	16	22	49.8	2	0.8		T	
09 May		eP	16	23	31.8	2	0.8		T	
09 May		eP	17	48	33.2	16	0.4	NE	NR	△(S-P) = 1.7°
		e			43.0		0.4			
		eS			54.4	999				
09 May		eP	17	51	59.4	1	0.6		T	

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
09 May		eP	18	05	58.0	2	0.4		NR	△(S-P) = 1.7°
	E	eS		06	19.5		0.4			
09 May		eP	22	20	06.4	2	0.2		NR	△(S-P) = 1.7°
	E	eS			27.8		0.4			
09 May		eP	22	42	35.6	1	0.4		NR	△(S-P) = 1.7°
	N	eS			57.2		0.4			
10 May		eP	00	21	28.4	2	0.3		NR	△(S-P) = 2°
	N	eS			53.4		0.3			
10 May		eP	01	41	24.0	2	0.8		T	
10 May		eP	01	49	13.6	1	0.2		NR	△(S-P) = 4.6°
		e			21.9		0.4			
		e			29.8		0.5			
	N	eS		50	07.2		0.4			
		e			15.0		0.3			
		e			30.4		0.5			
10 May		eP	04	48	17.6	2	1.0		T	
10 May		eP	05	16	46.6	4	1.2		T	
10 May		eP	08	21	41.8	1	0.8		T	
10 May		eP	08	28	36.8	2	0.9		T	
10 May		eP	08	35	39.8	2	0.8		T	
10 May		eP	09	02	56.0	10	1.3		T	9.1 N 71.1 W
		ePcP		05	23.2		0.7			Venezuela
										h about 50 km
										0 = 08 55 59.3
10 May		eP	09	47	43.4	2	0.9		T	Possible new event at
		e		49	03.4		0.9			09 49 03.4

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
10 May		eP	10	17	51.8	51	1.3		T	15.8 S 172.3 W
		e		18	02.0		0.8			Samoa Islands region
		e			10.0		0.9			h about 52 km
		e			22.6		1.0			0 = 10 05 13.7
	LPN	eS		28	23		20.0			Strong surface waves on
	LP	eSur		45	00					LP
10 May		eP	11	44	43.6	35	0.8		T	
10 May		eP	12	05	45.0	2	0.8		T	
10 May		eP	14	20	40.1	4	0.8		T	
		e			45.3		0.8			
10 May		eP	14	27	03.7	2	0.8		T	
		e			09.0		0.8			
10 May		eP	14	28	37.2	7	0.8		T	
		e			44.6		0.6			
10 May		eP	14	44	25.4	2	0.8		T	
10 May		eP	17	20	54.4	6	1.4		T	
10 May		eP	17	59	08.8	2	0.4		T	
		e	18	00	27.0		0.5			
10 May		eP	18	26	13.4	1	0.4		T	
		e(Sur)		29	54.4		1.2			
	LPE	e		30	20		15.0			
	BB	e			32		11.0			
11 May		eP	00	17	10.3	2	1.0		T	
11 May		eP	00	25	58.8	9	1.4		T	
11 May		eP'	01	10	48.8	2	0.7		T	8.4 S 112.5 E
		e		11	01.3		0.9			Near coast of Java
		eSKP		14	25.0		1.2			h about 39 km
		e(SKKP)		22	45.8		1.0			0 = 00 51 24.2

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
11 May		eP	01	56	27.8	6	1.4		T	
11 May		eP	04	05	15.8	4	0.9		T	
11 May		eP	05	04	08.4	2	1.0		T	
11 May		eP	05	04	39.0	73	2.0		T	40.9 N 126.8 W
	LPE	eS		09	07		10.0			Off coast of northern
	LPE	eSur		12	17					California
	LP	eSur		13	53					h about 61 km
										0 = 04 59 33.5
										Medium surface waves
										on LP and BB
11 May		eP	05	38	57.9	2	1.0		T	19.1 S 178.0 W
		e		39	17.0		0.8			Fiji Islands region
		epP		40	44.0		1.2			h about 486 km
										0 = 05 26 36.2
11 May		eP	07	04	05.5	3	0.8		T	
11 May		eP	08	50	09.1	79	1.5		T	37.2 S 73.6 W
		e			17.6		1.8			Near coast of southern
		e		51	06.2		1.3			Chile
		ePP		53	12.0		1.8			h about 47 km
	LPN	eS		59	52		20.0			0 = 08 38 27.1
	LPE	ePS	09	00	25		19.0			Strong surface waves
	LPE	eSS		04	09		20.0			on LP
	LPE	e		08	18		23.0			Medium surface waves
	LP	eSur		14	25					on BB
11 May		eP	13	37	55.1	1	0.6		T	43.8 N 148.6 E
		e		38	07.7		0.8			Off northeast coast of
										Hokkaido, Japan
										h about 43 km
										0 = 13 25 42.4

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
11 May		e	13	48	57.9	4	0.6		T	44.1 N 149.1 E
										Kurile Islands
										h about 57 km
										0 = 13 36 36.2
11 May		eP	14	54	43.1	24	1.8		T	Weak surface waves
	LPN	e(Sur)	15	02	32					on LP and BB
	LP	eSur		03	53					
11 May		eP	18	52	31.1	14	0.2		L	$\triangle$(S-P) = 0.1°
		eS			34.4	999				
11 May		eP	18	54	00.9	70	1.6		T	40.7 N 127.3 W
	BBE	eS		58	20		10.0			Off coast of northern
	LPN	eSur	19	01	00					California
	LP	eSur		03	33					h about 43 km
										0 = 18 48 50.7
										Mag. 4-1/2 (Berk)
										Strong surface waves
										on LP and BB
11 May		eP	21	02	30.4	49	2.0	WNW	T	Medium surface waves
	LPN	eSur		09	55					on LP and BB
	LP	eSur		11	55					
11 May		eP	21	23	04.0	27	0.4	ENE	NR	$\triangle$(S-P) = 1.6°
		e			12.9		0.4			
		eS			24.4	999				
		e			27.8	999				
11 May		eP	23	19	27.6	33	1.6	WNW	T	Medium surface waves
	LPN	e(Sur)		27	00					on LP
	LP	eSur		28	55					
11 May		eP	23	35	43.7	2	0.3	SE	NR	$\triangle$(S-P) = 1.7°
		eS		36	05.0	999				

DATE	Syst.	Phase	Arrival Time G.C.T.			Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h.	m.	s.					
12 May		eP	03	35	28.8	13	1.4		T	Weak surface waves on LP
	LPN	eSur		43	00					
	LP	eSur		45	00					
12 May		eP'	03	59	38.2	3	1.1		T	0.0 97.9 E
		e			46.2		1.2			Near coast of Sumatra
										h about 81 km
										0 = 03 40 20.1
12 May		eP	04	02	53.8	2	0.8		T	
		e		03	02.0		1.0			
12 May		eP	04	57	57.0	3	1.0		T	27.7 S 176.2 W
	LPE	e(SKKS)	05	09	29		15.0			Kermadec Islands region
	LPE	e(Sur)		26	00					h about 60 km
	BB	eSur		30	15					0 = 04 44 28.6
	LP	eSur		32	22					Weak surface waves on LP and BB
12 May		eP	06	25	30.0	13	1.4		T	Weak surface waves on LP and BB
		e		26	26.2		1.2			
	LPN	e(Sur)		33	10					
	LP	eSur		35	02					
12 May		eP	06	32	28.4	4	1.2		T	
12 May		eP	06	36	31.6	3	1.0		T	
		e			44.8		2.5			
		e		37	08.2		2.0			
12 May		eP	06	40	55.8	1	0.6		T	
		e		41	27.2		1.2			
12 May		eP	07	37	32.1	1	1.0		T	28.2 S 176.2 W
										Kermadec Islands region
										h about 21 km
										0 = 07 24 04.6
12 May		eP	10	11	03.2	2	0.8		T	

DATE	Syst.	Phase	Arrival Time G.C.T.			Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h.	m.	s.					
12 May		eP	10	14	39.1	3	0.8		T	
		e			45.9		0.8			
12 May		eP	10	51	22.9	2	0.8		T	
		e			31.1		0.8			
12 May		eP	15	02	15.8	6	0.7	SE	T	
		e			23.6		1.0			
12 May		eP	17	42	12.7	130	2.0		T	40.6 N 127.4 W
	LP	e		45	50		20.0			Off coast of northern
	LPE	eS		46	40		11.0			California
	LPN	eSur		49	22					h about 27 km
	LP	eSur		51	40					0 = 17 36 59.9
										Mag. 4-1/2 (Berk)
										Medium surface waves on LP and BB
12 May		eP	18	14	14.4	1	1.0		T	
12 May		eP	19	26	20.1	3	0.3	NR		$\triangle$(S-P) = 2.2°
	E	eS			46.6		0.4			
12 May		eP	21	55	15.0	10	1.2	WNW	T	Weak surface waves on
		e		57	01.6		1.2			LP and BB
	LPN	e(Sur)	22	02	20					
	LP	eSur		04	45					
12 May		eP	22	29	08.8	1	0.4	NR		$\triangle$(S-P) = 2.5°
	N	eS			39.0		0.5			
12 May		eP	22	49	02.4	4	0.7		T	
13 May		eP	00	00	25.0	6	1.2		T	
13 May		eP	02	49	00.1	6	1.4		T	
13 May		eP	03	33	15.5	4	1.2		T	

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
13 May		eP	03	36	30.8	2	1.0		T	
13 May		eP	04	17	03.0	6	1.2		T	
13 May		eP	05	17	03.3	1	0.6		T	
13 May		eP	05	23	50.7	1	0.8		T	
13 May		eP	05	48	30.8	73	2.0		T	40.9 N 127.6 W
	LPE	eS		53	09		15.0			Off coast of northern
	LPN	eSur		55	40					California
	LP	eSur		57	58					h about 25 km
										0 = 05 43 16.1
										Medium surface waves
										on LP and BB
13 May		eP	06	34	24.6	2	0.7		T	
		e			34.4		0.7			
13 May		eP	08	00	04.6	2	1.0		T	
13 May		eP	08	52	48.5	165	2.4		T	40.6 N 127.6 W
		e		53	18.6		1.2			Off coast of northern
		e(PP)			30.0		2.6			California
	LPE	eS		57	16		12.0			h about 43 km
	LPE	eSur	09	00	00					0 = 08 47 36.7
	LPE	eSur		02	14					Mag. 4-1/2 (Berk)
										Strong surface waves
										on LP and BB
13 May		eP	10	18	43.5	1	0.6		T	
13 May		eP	12	50	20.6	999			T	11.8 N 88.1 W
		e		51	21.1		1.0			Off coast of Nicaragua
		ePcP		54	04.5		0.6			h about 74 km
		e			18.1		0.8			0 = 12 45 04.2
	N	eS			34.1		1.8			
		e		55	55.7		1.0			
		eScP		57	40.1		0.8			

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Motion A	T	Dir.	Type	Remarks
1961										
13 May		eP	13	55	15.6	2	1.0		T	27.8 S 176.2 W
		e			26.7		1.0			Kermadec Islands region
	LP	eSur	14	30	00					h about 32 km
	BB	eSur		32	40					0 = 13 41 48.1
										Weak surface waves on
										LP and BB
13 May		eP	14	32	11.5	5	1.0		T	27.9 S 176.0 W
		e			48.1		1.1			Kermadec Islands region
		e		33	00.7		1.2			h about 25 km
	BBE	eSKS		42	51		10.0			0 = 14 18 42.4
	BBN	e(S)		43	38		12.0			Strong surface waves on
	LPE	eSur	15	00	15					BB and LP
	LP	eSur		01	34					Weak surface waves on SP
	LP	eSur		06	50					
		eSur		11	00					
13 May		iP	15	05	10.2	c 97	1.2		T	17.5 S 178.8 W
		e			35.6		1.4			Fiji Islands region
		e		06	24.2		1.2			h about 556 km
		epP		07	15.2		1.3			0 = 14 52 55.3
		ePP		09	03.2		1.5			
		e			55.4		1.4			
	N	e(SKS)		14	54.8		2.0			
	N	eS		15	31.8		2.2			
		ePKKP		22	24.5		0.7			
13 May		eP	16	01	47.7	9	1.1		T	43.4 N 147.8 E
		e			59.7		1.2			Off northern coast of
		e		02	44.8		1.2			Hokkaido, Japan
		ePP		04	48.2		1.3			h about 31 km
										0 = 15 49 29.6
13 May		eP	17	51	10.4	2	0.8		T	

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
13 May		eP	18	50	51.0	2	0.9		T	41.0 N 127.0 W
		e		51	10.4		1.6			Off coast of northern
		e			31.8		1.8			California
	LPE	eS		55	07.5		15.0			h about 25 km
	LPN	eSur		58	15					0 = 18 45 44.9
	LP	eSur	19	00	22					Medium surface waves on BB and LP
13 May		eP	19	52	18.3	3	1.0		T	13.7 N 99.4 W
		e(PP)			34.6		1.8			Off southern coast of
		e			54.0		0.8			Mexico
		e		53	04.8		1.0			h about 64 km
	BB	e		55	46		6.0			0 = 19 47 42.4
		e		56	51.7		1.0			Strong surface waves on
		eSur		57	44.0		2.5			all systems
	LPE	eSur		58	06					
	BBE	eSur			26					
	BB	eSur		59	16					
	LP	eSur			30					
14 May		eP	02	56	49.3	3	1.0		T	27.9 S 176.3 W
		e		57	01.7		1.0			Kermadec Islands region
	LP	eSur	03	31	00					h about 47 km
										0 = 02 43 22.7
										Medium surface waves on LP and BB
14 May		eP	03	23	33.9	8	0.8	NNW	T	
		e			47.2		0.9			
14 May		eP	04	34	08.5	4	0.8		T	
14 May		eP	06	45	22.0	1	0.6		T	
14 May		eP	08	03	20.2	3	1.1		T	
		e		05	30.4		1.0			
14 May		eP	08	34	22.8	1	1.0		T	

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
14 May		eP	11	38	08.6	1	0.7		T	
14 May		eP	13	51	48.1	1	0.8		T	Weak surface waves on
		e		52	45.8		1.0			LP and BB
	IB	e		55	28		3.0			
	LP	eSur	14	26	30					
14 May		eP	15	14	39.7	3	0.9		T	
14 May		eP	15	17	32.6	2	0.9		T	67.7 N 18.4 W
	LP	eSur		36	25					North of Iceland
	LP	eSur		38	00					h about 47 km
										0 = 15 08 04.2
										Weak surface waves on LP and BB
14 May		eP	15	47	39.0	29	1.4		T	67.7 N 18.4 W
		e		48	00.0		1.0			North of Iceland
		e			39.8		1.8			h about 23 km
	LP	eSur	16	05	25					0 = 15 38 07.5
	LP	eSur		08	05					Medium surface waves on LP and BB
14 May		eP	17	57	08.9	4	1.2		T	
14 May		eP	19	20	54.6	9	1.6		T	
		e		21	09.6		1.6			
14 May		eP	19	36	44.0	262	2.6		T	40.8 N 127.4 W
		e		37	00.4		2.3			Off coast of northern
	LPE	eS		41	12		13.0			California
	LPN	eSur		43	44					h about 45 km
	LP	eSur		46	10					0 = 19 31 34.4
										Mag. 4-1/2 (Berk), 5 (Pal)
										Strong surface waves on LP and BB
										Weak surface on SP and IB
14 May		eP	20	58	08.8	5	1.0		T	

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
14 May		eP	22	54	09.2	27	1.3	NW	T	
		e			32.6		0.9			
15 May		eP	03	38	05.0	1	0.6		T	
15 May		eP	03	57	11.8	1	1.0		T	
15 May		eP	04	37	54.5	12	1.6		T	
15 May		eP	04	46	05.5	3	1.1		T	
15 May		eP	06	04	26.3	999		NW	L	△(S-P) = 0.1°
		eS			29.4	999				
15 May		eP	11	27	57.1	2	0.9		T	
15 May		eP	11	35	57.0	1	0.9		T	
15 May		eP	14	26	45.0	2	0.6		T	
		e		31	21.5		1.1			
15 May		eP	18	07	26.9	2	0.4		NR	△(S-P) = 1.7°
		e			37.1		0.4			
		eS			48.4	999				
15 May		eP	19	42	25.4	4	1.0		T	
15 May	LP	eSur	20	00	30				T	Medium surface waves
	LP	eSur		02	00					on LP may be surface of
	LP	eSur		08	44					preceding event
	LP	eSur		14	20					
15 May		eP	20	19	28.2	2	0.8		T	
15 May		eP	21	06	08.3	13	0.8		T	20.0 S 177.2 W
		ePKKP		23	17.4		1.0			Tonga Islands region
		eP'P'		31	30.7		1.1			h about 89 km
										0 = 20 53 05.3

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
15 May		eP	21	08	00.0	11	1.0		T	Phases of this event may
		e			40.0		1.1			be part of preceding event
		e		09	00.0		1.0			
		e(PP)			59.6		1.0			
	E	e(S)		15	56.2		2.0			
	BBE	e		16	38		8.0			
16 May		eP	00	10	08.3	4	1.2		T	
16 May		eP	00	54	20.0	2	1.2		T	
16 May		eP	03	41	31.2	4	0.9		T	51.8 N 171.3 W
		e			48.0		1.6			Fox Islands, Aleutian
	LPE	eS		49	00		10.0			Islands
	LPN	eSur		56	40					h about 38 km
	LP	eSur	04	00	20					0 = 03 32 11.7
										Weak surface waves on
										LP and BB
16 May		eP	04	02	00.7	1	0.7		T	52.0 N 171.5 W
		e			11.2		1.2			Fox Islands, Aleutian
		e			46.4		1.4			Islands
	LP	eSur		21	00					h about 62 km
										0 = 03 52 43.7
										Weak surface on LP
16 May		eP	04	20	27.4	1	1.0		T	
16 May		eP	04	32	40.6	4	1.0		T	
16 May		eP	07	48	23.0	1	0.6		T	
		e			35.9		0.7			
16 May		eP	09	50	07.8	6	1.0	SE	T	
		e			18.7		0.8			
		e			42.8		1.0			
		e		54	03.6		1.2			

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
16 May		eP	12	10	08.2	14	1.4		T	41.2 N 126.6 W
	LPN	eSur		17	40					Off coast of northern
	LP	eSur		19	35					California
										h about 25 km
										0 = 12 05 03.6
										Weak surface waves on LP
16 May		eP	17	41	00.5	5	1.3		T	27.9 S 176.4 W
	BBE	eSKS		51	40		10.0			Kermadec Islands region
										h about 53 km
										0 = 17 27 34.1
										LP system inoperative
16 May		eP	18	01	06.4	3	0.3		NR	△(S-P) = 1.7°
		e			16.1		0.5			
		eS			28.2	999				
16 May		eP	18	01	59.0	51	1.6		T	16.1 N 87.3 W
		e		02	14.1		1.2			Near coast of Honduras
		eSur		05	53.0		1.6			h about 117 km
										0 = 17 57 20.8
										Medium surface waves
										on BB and SP
										LP system inoperative
16 May		eP	18	17	30.6	6	1.0		T	
16 May		eP	21	59	08.5	27	1.7		T	30.0 N 132.0 E
		ePP	22	03	10.6		2.0			Ryukyu Islands
										h about 25 km
										0 = 21 45 24.0
										Mag. 5-1/4 - 5-1/2 (Pal)
16 May		eP	22	15	56.1	7	1.5		T	Possible PKKP of
		e		16	06.5		0.9			preceding event
17 May		eP	00	29	11.2	1	0.4		NR	△(S-P) = 2.2°
	E	eS			37.8		0.5			

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
17 May		eP	01	06	46.2	2	0.4		NR	△(S-P) = 1.7°
		e			55.4		0.3			
		eS		07	07.6	999				
17 May		eP	02	03	35.7	20	1.1	SE	T	
		e		05	35.1		1.0			
		eSur		07	29.1		1.0			
	BBE	e			43		14.0			
17 May		eP	02	06	04.0	89	2.0	SE	T	
		e			30.9		1.3			
17 May		eP	03	17	08.8	5	1.3		T	
17 May		eP	03	27	03.8	39	1.8		T	40.5 N 127.4 W
		e		28	56.6		1.2			Off coast of northern
	LPE	eSur		34	40					California
	LP	eSur		36	30					h about 48 km
										0 = 03 21 52.4
										Weak surface waves
										on BB and LP
17 May		eP	04	14	28.9	8	1.0		T	
17 May		eP	04	19	21.5	13	1.3		T	
		e		24	36.2		1.2			
17 May		eP	06	05	05.2	9	1.2		T	
17 May		eP	06	11	22.8	4	1.2		T	
17 May		eP	06	39	45.8	26	1.8		T	40.7 N 126.1 W
										Off coast of northern
										California
										h about 69 km
										0 = 06 34 48.5
17 May		eP	08	45	37.6	16	0.9		T	49.0 N 155.6 E
										Kurile Islands
										h about 36 km
										0 = 08 34 03.2

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
17 May		eP	10	22	14.2	2	0.3		NR	△(S-P) = 2.3°
	E	eS			42.7		0.6			
17 May		eP	14	38	27.2	2	0.6		T	
17 May		iP	19	39	42.6	c 54	1.1		T	52.0 N 173.9 E
		ePP		42	10.6		2.4			Near Islands, Aleutian
		e		43	09.7		1.2			Islands
	E	eS		48	06.0		3.1			h about 21 km
	E	ePS			18.7		4.1			0 = 19 29 19.3
	N	eScS		49	31.0		2.2			Mag. 6 (Pas), 6-1/4 -
	BBE	eSur	20	00	14					6-1/2 (Pal)
	BB	eSur		06	30					Strong surface waves on BB
		eP'P'		08	46.7		1.0			Weak surface waves on SP
										LP system inoperative
17 May		iP	22	48	26.5	c 16	1.0		T	15.4 S 172.6 W
										Samoa Islands region
										h about 25 km
										0 = 22 35 44.5
18 May		eP	01	55	22.6	12	0.8	SE	T	
18 May		eP	03	18	02.5	3	1.0		T	53.0 N 165.6 W
										Andreanof Islands,
										Aleutian Islands
										h about 30 km
										0 = 03 09 08.9
18 May		eP	04	40	13.9	25	1.8	SE	T	
		e			58.3		0.6			
18 May		eP	06	50	20.9	9	0.9	NW	T	
18 May		eP	08	56	11.4	18	1.5		T	40.8 N 128.0 W
										Off coast on northern
										California
										h about 55 km
										0 = 08 50 55.2

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
18 May		eP	09	43	06.5	74	1.9		T	40.5 N 127.5 W
		e		48	13.0		2.2			Off coast of northern
	LPN	eSur		50	40					California
	LP	eSur		52	22					h about 36 km
										0 = 09 37 54.8
										Medium surface waves
										on LP and BB
18 May		eP	09	49	38.1	16	1.5		T	
		e		50	19.1		0.9			
18 May		eP	11	17	55.2	2	0.4		NR	△(S-P) = 1.8°
		eS		18	17.3	999				
18 May		eP	11	41	44.9	3	1.0		T	
18 May		eP	18	38	39.4	4	1.0		T	
18 May		eP	19	16	19.8	6	1.2		T	
18 May		eP	20	30	42.0	4	1.2		T	
18 May		eP'	20	56	43.2	2	0.5		T	4.6 N 125.7 E
		e		57	35.5		1.8			Near south coast of
		e		58	11.2		1.3			Mindanao, P.I.
		e		59	17.5		1.5			h about 126 km
	LP	eSur	21	40	00					0 = 20 37 57.0
										Weak surface waves on LP
18 May		eP	22	15	17.9	4	0.9		T	3.3 S 103.3 W
		e			24.7		0.8			Southwest of Galapagos
		ePcP		17	34.2		0.6			Islands
	LPE	e		21	25		20.0			h about 60 km
										0 = 22 08 00.4
18 May		eP	23	22	03.7	45	1.6		T	38.2 S 73.4 W
		e			12.3		1.5			Near coast of Central Chile
	LPE	eSur		46	00					h about 25 km
	LP	eSur		49	20					0 = 23 10 13.7
										Weak surface waves on LP

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
18 May		eP	23	35	46.9	4	0.3		NR	△(S-P) = 1.7°
		e			57.1		0.4			
		eS		36	08.7	999				
18 May		eP	23	43	23.2	2	0.6		T	
		e			28.6		0.8			
19 May		eP	00	02	34.0	18	1.6		T	
19 May		eP'	01	09	14.4	2	0.8		T	3.8 N 125.7 E Off coast of Mindanao, P.I. h about 77 km 0 = 00 50 20.8
19 May		eP	01	19	04.1	2	0.8		T	
19 May		eP	01	34	24.2	1	0.6		T	
		e			43.8		0.6			
19 May		eP	02	58	04.8	1	0.6		T	
19 May		eP	03	55	16.8	3	0.9		T	15.8 S 172.8 W
		e			29.0		1.5			Tonga Islands
		e		56	00.4		1.4			h about 25 km
	LPN	eS	04	05	50		15.0			0 = 03 42 31.1
	LP	eSur		23	00					Weak surface waves on LP
19 May		eP	08	38	25.8	1	0.6		T	
19 May		eP	09	30	49.3	999			T	11.3 N 88.3 W
		e(P)		31	03.6		0.7			Off coast of Nicaragua
		ePcP		34	32.2		0.6			h about 34 km
		e(PcP)			45.7		0.6			0 = 09 25 26.6
	BBE	e(S)		35	03		3.5			Strong surface waves
	E	eS			04.0		1.9			on LP
	E	e(S)			19.2		1.8			Weak surface waves on BB
	BB	e			25		5.5			
	LP	eSur		37	49					
	E	ePcS		38	12.0		1.0			
	E	e(PcS)			25.8		1.0			

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
19 May		eP	14	52	53.6	55	1.6	WNW	T	Medium surface waves on
		e		55	01.6		2.0			LP and BB. LPE
	LPN	eSur	15	00	40					inoperative
	LP	eSur		02	10					
19 May		eP	16	56	08.8	3	1.0	NW	T	
		e			28.2		1.4			
		e			56.2		1.8			
19 May		eP	17	07	07.6	1	0.9		T	
19 May		eP	17	48	30.8	2	0.8		T	
20 May		eP	00	08	08.1	4	1.0		T	
20 May		eP	00	28	14.0	2	0.9		T	
20 May		eP	00	53	21.6	2	0.8		T	52.1 N 170.4 W Fox Islands, Aleutian Islands h about 71 km 0 = 00 44 12.2
20 May		eP	07	17	04.2	5	1.0		T	73.2 N 6.4 E
		e(PcP)			47.1		0.8			Arctic Ocean h about 53 km 0 = 07 06 51.5
20 May		eP	12	03	10.9	3	1.0		T	44.0 N 148.8 E
		e			22.9		0.7			Kurile Islands h about 59 km 0 = 11 51 01.2
20 May		eP	12	23	33.2	2	0.8		T	
20 May		eP	14	29	28.5	2	0.5		T	

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
20 May		eP	17	33	50.3	3	1.0		T	74.5 N 14.4 E
		e(PcP)		34	26.9		0.7			Svalbard region
										h about 57 km
										0 = 17 23 27.6
20 May		eP	17	57	33.1	6	1.1		T	72.9 N 05.6 E
		ePcP		58	16.3		0.8			Arctic Ocean
										h about 46 km
										0 = 17 47 19.3
20 May		eP'	18	11	01.2	12	1.2		T	6.5 S 31.7 E
		e			06.3		1.3			Tanganyika
		ePP		12	52.0		1.8			h about 58 km
		e		15	55.4		1.2			0 = 17 52 04.6
20 May		eP	19	41	01.8	2	0.8		R	
		e			24.8		0.8			
	E	eSur		42	34.5		0.8			
20 May		eP	20	57	14.3	1	1.0		T	
20 May		eP	23	10	48.1	1	0.6		NR	$\triangle$(S-P) = 2.8°
	E	eS		11	21.4		0.6			
21 May		eP	00	06	45.8	1	0.7		T	
		e		07	13.9		1.0	SE		
21 May		eP	01	19	25.4	1	0.6		T	48.0 N 86.0 E
										Kazakh, SSR
										Sinkaing, China border
										h about 88 km
										0 = 01 05 58.4
21 May		eP	02	33	39.4	3	1.0		T	
21 May		eP	02	58	56.7	11	1.5		T	Weak surface waves on
		e		59	04.8		1.4	WNW		LP and BB
	LPN	eSur	03	06	30					LPE inoperative
	LP	eSur		08	10					

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
21 May		eP	03	46	23.8	230	2.5	WNW	T	Strong surface waves on
	LPN	eS		50	49		20.0			LP and BB
	LPN	eSur		53	29					LPE inoperative
	LP	eSur		55	48					
21 May		eP	05	36	47.4	3	1.0		T	
21 May		eP	05	47	06.0	1	0.8		T	
21 May		eP	08	01	01.6	9	1.4		T	
		e			10.2		1.5			
21 May		eP	08	03	43.6	32	1.6	WNW	T	Medium surface waves
	LPN	eSur		11	15					on LP and BB
	LP	eSur		13	10					LPE inoperative
21 May		eP	08	10	11.4	8	0.6	SE	R	
	E	eSur		13	37.0		0.6			
21 May		eP	08	42	43.4	2	0.7		T	11.1 S 78.1 W
		ePcP		44	05.5		0.5			Near coast of Peru
										h about 154 km
										0 = 08 34 04.3
21 May		eP	14	27	11.9	2	0.9		T	
21 May		eP	15	20	29.6	82	2.0		T	40.5 N 127.5 W
	LPN	eSur		28	17					Off coast of northern
	LP	eSur		30	05					California
										h about 25 km
										0 = 15 15 14.7
										Medium surface waves
										on LP and BB
										LPE inoperative
21 May		eP	15	23	14.4	221	2.4	WNW	T	Medium surface waves
	LPN	eSur		30	46					on LP and BB
	LP	eSur		32	40					LPE inoperative

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
21 May		eP	15	59	28.2	4	0.8		T	
21 May		eP	16	09	29.4	2	0.8		T	
21 May		eP	16	49	24.4	36	2.0		T	Weak surface waves
	LPN	eSur		57	00					on LP
	LP	eSur		59	00					LPE inoperative
21 May		eP	17	49	14.6	10	1.0		T	3.1 S 80.9 W
		ePcP		51	12.9		0.8			Near coast of Ecuador
	N	eS		55	29.7		2.0			h about 27 km
	LP	eSur	18	04	25.					0 = 17 41 28.2
										Mag. 6-1/2 (Pal)
										Strong surface waves
										on LP
21 May		eP	18	25	54.4	7	1.2		T	18.8 S 173.6 W
		e		26	11.8		0.7			Tonga Islands
										h about 60 km
										0 =18 13 02.9
21 May		eP	20	56	19.2	4	0.9		T	
21 May		eP	20	57	42.4	2	0.6		T	Possible PcP of
										preceding event
21 May		eP'	21	59	02.8	16	1.1		T	34.3 S 150.4 E
										New South Wales,
										Australia
										h about 27 km
										0 = 21 40 03.2
22 May		eP	01	29	28.3	2	0.7		T	25.0 S 67.3 W
		e(PcP)			55.5		0.6			Salta Province,
		e(pP)		30	27.6		0.9			Argentina
										h about 273 km
										0 = 01 19 05.1
22 May		eP	04	12	21.3	1	0.6		T	

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Motion A	T	Dir.	Type	Remarks
1961										
22 May		eP	05	39	56.0	10	1.3	WNW	T	
22 May		eP	09	08	49.4	7	0.6		T	49.0 N 155.6 E
		e		09	01.1		0.9			Kurile Islands
		e			25.1		0.7			h about 32 km
		e			48.3		1.0			0 = 08 57 15.0
	LP	eSur		36	00					Weak surface waves on LP
22 May		eP	13	57	34.2	30	1.6		T	21.3 S 174.4 W
		e(pP)			53.6		0.9			Tonga Islands
		e		58	13.3		1.2			h about 97 km
		e			37.7		1.4			0 = 13 44 35.8
		ePP	14	01	00.3		1.9			Mag. 6 (Pas), 5-3/4 (Berk)
	E	e(SKKS)		08	05.3		3.2			6-1/4 (Pal)
	E	eS			29.3		2.6			Strong surface waves
	LPN	eS			34		19.0			on BB and LP
	LPN	e(PPS)		10	10		17.0			Weak surface waves on SP
	LPN	e(SS)		14	05		22.0			LPE inoperative
		ePKKP		15	03.8		0.8			
	LPN	e		27	00		28.0			
	LP	eSur		29	30					
22 May		eP	14	20	28.8	2	0.6		T	
		e			38.3		0.6			
		e			50.3		1.0			
		e		22	28.7		0.6			
22 May		eP	14	35	18.2	2	0.8		T	
22 May		eP	14	53	29.8	2	0.6		T	
22 May		eP	15	39	55.2	5	1.0		T	
		e		40	24.5		1.0			
22 May		iP	17	03	15.1	c 999		NE	L	$\triangle$(S-P) = 0.1°
		eS			17.9	999				

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
22 May		iP	17	45	34.3 c	999	0.8		T	22.8 S 176.1 W
		e		48	44.5		2.0			Tonga Islands
		ePP		49	10.9		2.1			h about 35 km
	BB	ePP			19		9.0			0 = 17 32 21.6
	BB	e			50		12.0			Mag. 6-1/2 - 6-3/4 (Pas)
	BBE	eSKS		56	07		6.5			Strong surface waves
	BBE	eS			40		7.0			on LP and BB
	BBE	e		57	10		7.5			Weak surface waves on
	IB	e(PS)			55		4.0			SP and IB
	LP	e(SPP)		58	05		24.0			LPN and E inoperative
	BB	e	18	01	25		9.0			LPZ inoperative until
		ePKKP		02	45.4		0.7			1758Z
	LP	e(SS)		03	22		21.0			
		e		04	53.5		0.8			
	LP	e		10	15		29.0			
		eP'P'			59.1		1.4			
	LP	eSur		15	28					
		e		17	49.9		1.0			
22 May		eP	18	06	26.7	2	0.2		NR	△(S-P) = 1.7°
		e			36.7		0.3			
	E	eS			48.7		0.4			
22 May		eP	18	07	26.2	3	0.3		NR	△(S-P) = 1.7°
		e			35.7		0.4			
	E	eS			47.5	999				
22 May		eP	19	14	00.2	2	0.7		T	
22 May		eP	19	39	26.7	9	1.5		T	
22 May		eP	19	50	48.9	14	1.5	WNW	T	LP system inoperative
22 May		eP	20	53	41.8	42	2.4		T	
22 May		eP	22	15	39.7	12	1.4		R	
		eSur		19	42.9		3.4			
	BB	e		21	13		8.0			

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
22 May		eP	22	59	51.8	2	0.8		T	
22 May		eP	23	34	06.1	1	0.3		NR	△(S-P) = 1.7°
	E	eS			27.3		0.4			
22 May		eP	23	59	26.1	18	1.0		T	22.6 S 177.0 W
		e			54.1		1.0			Tonga Islands region
23 May		e	00	00	04.4		0.7			h about 526 km
										0 = 23 47 03.2
23 May		eP	00	19	00.1	4	1.2		T	
		e		20	47.0		1.0			
23 May		eP	01	11	33.6	1	0.8		T	50.9 N 179.7 W
										Andreanof Islands,
										Aleutian Islands
										h about 51 km
										0 = 01 01 36.8
23 May		iP	02	58	29.2 c	161	1.6		T	36.4 N 28.3 E
	BB	e	03	00	40		8.0			Dodecanese Islands
	BB	ePP		02	15		7.0			h about 49 km
	BB	ePPP		04	16		8.5			0 = 02 45 16.0
	BB	e		06	00		8.0			Mag. 6-1/4 (Pas), (Pal)
		e			53.2		1.2			Strong surface waves on
	LPN	eSKS		09	00		20.0			LP and BB
	BBE	eS			25		8.0			Weak surface waves
	N	e			51		2.0			on SP and IB
	LPN	ePS		10	53		26.0			
	LPN	ePPS		11	16		26.0			
		ePKKP		15	37.2		1.0			
	LPN	e		16	51		28.0			
		eP'P'		23	42.0		1.4			
	LP	e			45		28.0			
	LPE	eSur		27	07					
	BB	eSur		30	13					
	LP	eSur		32	52					

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
23 May		eP	03	46	08.4	50	1.3		T	9.8 N 84.0 W
		e			25.5		0.9			Costa Rica
		e		53	32.5		2.0			h about 136 km
										0 = 03 40 26.1
										Interpretation difficult due to intermingling of signals
23 May		eP	03	48	52.2	999	0.8	SE	T	Interpretation difficult due to intermingling of signals
23 May		eP	03	58	01.8	7	0.8	SE	T	
23 May		eP	04	23	20.0	6	1.3		T	
		e			38.2		1.0			
23 May		e(Sur)	04	52	40.5		3.4		T	Possibly associated with preceding event
23 May		eP	06	13	10.3	1	0.8		T	
23 May		eP	07	22	07.2	5	1.0		T	
23 May		eP	08	28	57.8	4	1.1		T	
		eSur		33	08.2		2.8			
	BB	e		34	38		8.0			
23 May		eP	08	52	50.0	2	1.0		T	
23 May		e	11	13	19.4		1.3		T	LP system inoperative
		e(Sur)			44.6		2.5			Character indicates
	BB	e		15	16		8.0			Nicaragua source.
23 May		eP	12	10	11.4	4	1.2		T	
23 May		e(Sur)	12	24	00.0		1.8		T	LP system inoperative Character indicates Nicaragua source.
23 May		e(Sur)	13	06	43.7		2.2		T	Character indicates Nicaragua source. LP system inoperative

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
23 May		eP	14	18	11.2	1	0.5		T	LP system inoperative
		eSur		22	17.8		2.7			
	BB	eSur		23	45					
23 May		eP	16	01	19.3	1	0.7		T	
23 May		iP	16	50	07.7	c 999			T	12.6 N 87.3 W
		eSur		54	20.0	999				Near coast of Nicaragua
	BB	eSur			22					h about 138 km
	BB	e			56		10.0			0 = 16 44 59.4
	BB	e		55	38		10.0			Mag. 6-1/2 (Pas)
		eScS	17	01	02.4		1.2			Strong surface waves on BB, SP, and IB
										LP system inoperative
23 May		eP	16	57	16.8	12	0.9		T	Possible phase of preceding event
23 May		eP	17	17	21.0	4	1.1		T	Strong surface waves on BB, SP and IB
		eSur		21	28.5		2.5			LP system inoperative
	BB	e		22	00		4.0			
	BB	e			45		6.0			
	BB	e		23	03		8.0			
	BB	e(ScS)		28	26		5.0			
23 May		eP	17	33	19.3	4	1.2		T	
23 May		eP	18	05	45.5	1	0.6		T	
23 May		eP	22	09	55.2	999		NW	L	$\triangle$(S-P) = 0.1°
		eS		10	00.1	999				
24 May		eP	00	35	50.8	4	1.2		T	Strong surface on SP, BB, and IB
		eSur		39	57.5		2.6			Weak surface on LP
24 May		eP	01	20	23.2	4	1.1		T	
		e		23	18.9		1.1			
		eSur		24	22.7		2.8			
	BB	e		26	05		8.0			

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
24 May		eP	02	34	57.2	2	1.0		T	Strong surface on BB, SP, and IB
		eSur		39	02.2		3.4			
	LPE	e			20		15.0			Weak surface on LP
	BB	e		40	41		10.0			
		e			54.4		1.6			
		e		41	31.6		3.0			
	BB	e		43	08		7.0			
	BB	e		53	51		7.0			
24 May		eP	04	53	10.9	2	1.0		T	
		e(Sur)		57	19.7		2.5			
24 May		eP	07	59	46.8	1	0.9		T	
24 May		eP	11	14	24.2	3	1.1		T	
24 May		eP	13	04	57.0	17	1.4	WNW	T	Weak surface waves on LP and BB
		e		05	19.3		1.5			
	LPN	eSur		12	30					
	LP	eSur		14	07					
24 May		iP	13	39	43.7	c 50	0.9		T	43.3 N 126.9 W
		e			59.6		1.3			Off coast of Oregon
		e		40	17.4		0.8			h about 14 km
	LPN	eS		44	11		15.0			0 = 13 34 31.4
	LPN	eSur		46	32					Medium surface waves
	LP	eSur		49	04					on LP and BB
24 May		e(Sur)	17	33	48.1		1.0		T	Character indicates
	LPE	e			55		16.0			Nicaragua source.
	BB	e		34	55		10.0			
24 May		eP'	17	37	40.0	3	1.0		T	8.2 S 121.8 E
		e			57.9		0.7			Flores Sea
		eSKP		41	02.1		1.7			h about 36 km
										0 = 17 18 17.6

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
24 May		eP	19	04	04.1	6	1.4	SSE	T	Strong surface waves
		e		05	14.0		1.6			on BB, SP, and IB
		eSur		08	07.6		2.8			
	LPE	e			28		14.0			
		e			40.0		3.0			
	BB	e		09	44		9.0			
24 May		eP	20	14	50.0	2	0.3		NR	△(S-P) = 3.2°
		e			56.5		0.5			
	E	eS		15	28.1		0.4			
		eSur			33.8	999				
24 May		eP	21	32	00.4	2	0.5		NR	△(S-P) = 1.7°
		e			09.1		0.4			
		e			19.1		0.4			
		eS			21.8	999				
24 May		eP	22	12	42.0	9	1.6		T	
		e(Sur)		16	47.6		2.6			
25 May		eP	00	36	55.6	1	0.4		NR	△(S-P) = 1.6°
	N	eS		37	16.0		0.4			
25 May		eP	04	55	05.2	4	0.8		T	27.2 S 71.3 W
		ePcP			35.1		0.5			Near coast of northern
										Chile
										h about 46 km
										0 = 04 44 15.1
25 May		eP	05	05	04.8	1	1.0		T	
25 May		eP	05	33	26.2	2	0.8		T	
25 May		e	07	12	21.1	10	1.7		T	Character indicates
		e(Sur)			31.5		2.5			Nicaragua source

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
25 May		eP	09	31	53.1	1	1.0		T	31.3 N 139.9 E
		e		32	22.5		0.6			South of Honshu, Japan
										h about 171 km
										0 = 09 18 48.4
25 May		e	10	27	13.3		1.5		T	Character indicates
		e(Sur)		29	58.3		1.1			Nicaragua source
		e(Sur)		30	10.8		2.4			
		e			33.0		1.8			
	BB	e		31	34		9.0			
25 May		eP	11	55	32.7	4	1.2		T	
25 May		eP	17	46	58.9	2	1.0		T	22.7 S 176.1 W
		e		47	18.4		0.7			Tonga Islands
		e			44.3		0.8			h about 25 km
		e		48	20.1		0.6			0 = 17 33 44.6
25 May		eP	18	03	31.7	2	0.3	NW	NR	△(S-P) = 1.7°
		eS			53.3	999				
25 May		eP	18	53	52.7	4	0.7		T	22.7 S 176.8 W
										Tonga Islands
										h about 35 km
										0 = 18 40 37.9
25 May		eP	19	20	01.4	5	0.8	NW	T	
		e			30.8		0.7			
25 May		eP'	19	52	30.2	18	0.9		T	4.2 S 103.3 E
		e			43.5		1.0			Sumatra
										h about 93 km
										0 = 19 33 05.7
25 May		eP	20	50	50.2	7	1.3		T	
		eSur		54	53.8		2.7			
	LPE	e		55	14		15.0			
		e			30.6		3.0			
	BB	e		56	24		11.0			
	BB	e		57	46		6.0			

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
25 May		eP	21	19	45.1	7	1.0		T	14.8 S 177.4 W
										Fiji Islands region
										h about 417 km
										0 = 21 07 29.7
25 May		eP	21	53	32.2	1	0.6		T	
26 May		eP	03	33	07.4	11	0.8		T	32.9 S 109.6 W
		e			34.7		1.1			About 350 miles south
		eP'P'	04	01	24.2		1.7			of Easter Island
										h about 54 km
										0 = 03 22 08.6
26 May		iP	04	47	07.1	d 22	1.0		T	32.7 S 109.1 W
		e			52.2		1.0			Easter Island region
		ePP		49	36.8		1.6			h about 43 km
										0 = 04 36 08.5
26 May		eP	05	10	56.5	16	0.8		T	15.4 N 91.9 W
		e		11	37.0	999				Western Guatemala
	IB	e		12	00		2.0			h about 123 km
		eSur		14	50.0		1.1			0 = 05 06 27.0
										Strong surface waves on
										SP and IB
26 May		eP	06	20	40.5	1	1.0		T	18.6 S 169.1 E
										New Hebrides Islands
										region
										h about 132 km
										0 = 06 06 53.3
26 May		eP	08	50	27.3	2	0.6		T	10.1 S 70.6 W
		e		51	29.7		0.7			Peru - Brazil border
		e(pP)		52	20.7		0.8			h about 678 km
		e(PP)			23.5		1.2			0 = 08 42 15.0
		e		53	27.0		1.1			Phase reported 08 51 29.7
		eScP		54	25.2		0.9			possible new event
	E	eS		57	01.8		1.3			
	E	e		59	10.2		1.3			

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
26 May		eP	10	31	22.3	1	0.6		T	
		e		32	24.4		0.5			
26 May		eP	10	33	03.8	2	1.0		T	Possible phases of preceding event
		e			18.4		1.0			
26 May		eP	10	35	20.3	1	0.7		T	
26 May		eP	13	15	13.3	2	0.7		T	Weak surface waves on LP
		e			30.3		1.1			
	LPE	e		26	45		22.0			
	LPE	eSur		31	00					
26 May		eP	13	20	53.7	2	1.0		T	
		e		22	12.5		0.6			
26 May		e(Sur)	14	31	20.1		2.5		T	Character indicates Nicaragua source
26 May		eP	15	47	12.3	2	0.3		NR	△(S-P) = 1.8°
	E	eS			34.1		0.4			
26 May		eP	18	27	10.0	2	0.8		T	
26 May		eP	20	23	30.4	5	1.1		T	
26 May		eP	20	56	30.6	2	0.6	SW	T	
26 May		eP	21	50	44.2	3	0.9		T	
25 May		eP	23	02	35.0	1	0.6		T	38.4 N 142.9 E Near east coast of Honshu, Japan h about 60 km 0 = 22 49 49.4
27 May		eP	00	27	39.4	5	1.3		T	
	E	eSur		31	44.4		2.8			
	LPE	e		32	05		15.0			
	N	e			27.4		1.6			
	BB	e		33	22		8.0			

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
27 May		eP	02	40	01.4	1	0.7		T	
		e			38.6		0.9			
		e			59.8		1.3			
27 May		eP	03	06	32.7	2	0.7		T	51.2 N 176.3 W Andreanof Islands, Aleutian Islands h about 60 km 0 = 02 56 50.1
		e		07	27.5		0.9			
27 May		eP	04	45	58.8	15	0.8	SE	T	
		e		46	13.7		1.2			
		e		50	15.6		2.4			
27 May		eP	04	53	20.8	2	0.8		T	Possible phase of preceding event
27 May		eP	07	30	40.6	8	0.8		T	41.0 N 142.1 E Near north coast of Honshu, Japan h about 156 km 0 = 07 18 12.2 Medium surface waves on LP
		e			56.8		1.1			
	LPE	eS		41	12		15.0			
	LP	eSur	08	00	00					
27 May		e(P)	08	28	16.9	2	1.1		T	
27 May		eP	09	53	24.0	1	0.6		T	
27 May		eP	10	35	51.0	2	0.9		T	
27 May		eP	14	32	07.5	1	0.6		T	
27 May		eP	15	23	32.8	4	1.2		T	Strong surface waves on SP and IB
		eSur		27	38.4		2.6			
	LPE	e			55		15.0			
		e		28	10.0		2.2			
	BB	e			15		4.0			
	BB	e		29	14		8.5			
	BB	e		30	20		5.5			

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
27 May		eP'	17	11	44.2	1	0.5		T	0.8 N 98.5 E
		e			53.8		0.9			Near coast of northern
		ePP		14	51.2		2.2			Sumatra
	LP	eSur	18	11	28					h about 39 km
										0 = 16 52 19.3
										Medium surface waves
										on LP
27 May		eP'	17	45	54.9	4	0.9		T	1.2 N 98.4 E
		e		46	04.9		0.9			Near northwest coast of
		ePP		49	01.6		2.1			Sumatra
										h about 36 km
										0 = 17 26 32.2
27 May		eP	21	01	11.8	15	1.8		T	
		e(Sur)		05	10.8		2.8			
	LPE	e			27		14.0			
		e			50.0		2.8			
		e		06	01.8		1.8			
	BB	e			30		8.0			
27 May		eP	22	54	41.2	16	1.5		T	
		e		55	28.4		0.8			
		e			53.6		0.7			
27 May		eP	23	32	53.1	2	0.4		NR	$\triangle$(S-P) = 1.7°
		eS		33	14.2	999				
27 May		eP	23	40	29.8	2	0.3		NR	$\triangle$(S-P) = 2.1°
	E	eS			56.2		0.4			
28 May		eP	01	15	57.2	10	1.2		T	
		e		16	11.0		0.9			
28 May		eP	02	59	44.0	4	0.9		T	
28 May		eP	03	02	59.1	3	0.8		T	

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
28 May		eP'	04	19	25.2	24	1.0		T	5.4 S 102.4 E
		e		20	27.8		0.9			Off coast of southern
										Sumatra
										h about 74 km
										0 = 03 59 53.5
28 May		eP	05	35	46.2	6	1.2		T	
28 May		eP	07	42	04.9	2	1.0		T	
28 May		eP	10	27	40.3	2	1.1		T	
		e(Sur)		31	50.9		3.0			
		e		32	15.8		2.0			
28 May		eP	13	03	17.1	2	1.0		R	33.5 N 116.1 W
		e		04	28.4		1.0			Riverside County,
	N	eSur		07	23.0		1.6			California
										h about 31 km
										0 = 12 59 47.5
28 May		eP	13	22	24.2	4	1.4		T	
28 May		eP	16	13	12.2	9	1.6		T	
		eSur		17	21.1		2.9			
28 May		eP	16	52	19.3	999			L	$\triangle$(S-P) = 0.1°
		eS			23.4	999				
28 May		eP	17	17	52.5	12	1.2		R	29.8 N 113.8 W
		eSur		21	54.0		2.6			Gulf of California
	BB	e		23	32		18.0			h about 25 km
										0 = 17 14 37.7
										Strong surface waves
										on BB, IB, and SP

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
28 May		eP	18	47	17.3	2	0.5		T	
		e			36.6		0.8			
28 May		eP	19	41	37.1	1	0.6		T	26.0 S 179.7 E
		e		42	45.0		1.0			South of Fiji Islands
		e		43	55.7		0.9			h about 219 km
										0 = 19 28 21.9
28 May		eP	22	41	14.4	3	0.8		T	
		e			33.6		1.0			
		e		42	25.5		0.8			
	LP	e		43	35		24.0			
	LPE	e		44	45		20.0			
	LPE	e		46	00		20.0			
	LPE	e		47	26		15.0			
28 May		eP	23	24	24.4	2	1.3		T	
		e(Sur)		28	21.3		3.0			
29 May		eP	00	31	50.2	4	0.6		T	52.1 N 166.6 W
		e		32	21.2		1.5			Fox Islands, Aleutian
	LPN	eSur		47	15					Islands
	LP	eSur		49	03					h about 67 km
										0 = 00 22 55.6
										Weak surface waves
										on BB and LP

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
29 May		eP	05	05	15.9	9	0.8		T	
		e		06	10.0		1.0			
		e			47.5		0.9			
29 May		eP	05	16	55.6	1	1.0		T	
		e		18	32.4		0.9			
29 May		eP	06	55	21.2	6	1.4		T	
29 May		eP	07	25	04.5	9	0.9		T	
		e			24.1		1.0			
		e		26	12.0		0.9			
	LPE	e		28	28		19.0			
	LPE	e		29	44		27.0			
	BBE	e		30	18		13.0			
	LP	e		31	20		15.0			
	BB	e		32	16		8.0			
	BB	e		33	02		8.0			
29 May		eP	07	40	06.1	25	2.0		T	39.0 S 73.4 W
		e			14.4		1.6			Near coast of southern
		e			31.2		1.0			Chile
		e			45.8		1.1			h about 13 km
		e		41	27.4		1.2			0 = 07 28 11.7
		e		43	38.4		1.0			Strong surface waves
	LPN	eS		49	54		20.0			on LP
	LPE	eSS		55	10		24.0			Weak surface waves on BB
	LPE	e		58	12		20.0			
	LPN	eSur	08	00	42					
	LP	eSur		04	25					
29 May		eP	10	42	54.6	2	0.8		T	22.7 N 141.7 E
		e		43	06.7		0.8			Bonin Islands
										h about 25 km
										0 = 10 29 27.8

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
29 May		eP'	11	10	53.0	5	1.3		T	10.6 N 39.4 E
		e		11	22.2		1.5			Ethiopia
	LPE	eSur		45	15					h about 25 km
	LP	eSur		54	00					0 = 10 52 01.2
										Medium surface waves on LP
29 May		eP	11	58	44.5	1	0.8		T	
29 May		e(P)	12	10	26.3	111	3.0		T	
		e		11	02.0		2.0			
29 May		eP	15	20	27.7	1	0.7		T	
29 May		eP	18	04	10.6	2	0.2		NR	$\triangle$(S-P) = 1.7°
		eS			32.3	999				
29 May		eP	18	07	58.2	2	0.4		NR	$\triangle$(S-P) = 1.7°
		e		08	07.7		0.4			
		eS			19.8	999				
29 May		eP	19	42	55.5	9	1.4		T	
29 May		eP	19	59	19.3	6	1.4		T	
29 May		eP	20	52	09.7	6	1.2		T	
29 May		eP	21	42	00.0	1	0.3		NR	$\triangle$(S-P) = 2.2°
	E	eS			27.1		0.5			
29 May		eP	21	57	17.5	11	1.5		T	
29 May		eP	23	33	34.7	4	0.2		NR	$\triangle$(S-P) = 1.7°
		e			44.6		0.4			
		eS			56.5	999				
30 May		eP	01	53	05.9	6	1.4		T	

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
30 May		eP	04	31	50.0	6	1.0	SE	T	
		e		32	03.8		1.0			
30 May		eP	04	49	50.2	2	0.9		T	Possible phase of preceding event
30 May		eP	06	12	39.6	3	1.1		T	
30 May		eP	09	36	43.4	6	1.3		T	
30 May		eP	10	55	05.2	2	0.7		T	
30 May		eP	11	05	04.8	1	0.6		T	
30 May		eP	12	39	45.4	6	1.0		T	33.0 S 109.3 W
										Easter Island region
										h about 68 km
										0 = 12 28 42.8
30 May		eP	13	30	11.1	2	0.8		T	
30 May		eP	17	02	42.0	2	0.9		T	
30 May		eP	19	59	44.0	2	0.9		T	
30 May		eP	22	14	59.4	2	0.9		T	
		e		15	13.8		0.8			
		e			42.0		0.8			
31 May		eP	04	45	25.1	6	1.1		T	
		e		46	39.1		2.0			
		e		47	37.3		1.0			
		e(Sur)		49	33.1		2.8			
	LPE	e			50		15.0			
		e		50	04.1		3.2			
		e			43.1		2.0			
	BB	e			59		9.0			
	BB	e		52	25		7.0			
31 May		eP	05	35	48.6	2	0.9		T	

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
31 May		eP	06	21	48.6	4	1.0		T	
31 May		eP	06	39	21.8	3	1.1		T	
		e			40.9		1.1			
		e		43	23.8		1.0			
		e(Sur)			30.2		2.7			
	LPE	e			45		15.0			
		e(Sur)			57.8		3.0			
	BB	e		44	55		9.0			
	BB	e		46	13		7.0			
31 May		eP	07	37	22.6	1	0.6		R	
		e			48.8		0.6			
	E	eSur		38	43.4		0.6			
		eSur		39	26.0	999				
31 May		eP	09	02	08.9	1	0.8		T	
31 May		eP	09	17	18.2	1	0.8		T	
		e		20	48.8		2.0			
		e(Sur)		21	04.8		2.2			
31 May		eP	14	08	19.3	1	0.9		T	
		e		12	22.5		1.6			
		e(Sur)			40.7		2.4			
	LPE	e			44		15.0			
	BB	e		14	00		9.0			
	BB	e			35		7.0			
31 May		eP	14	20	55.1	36	1.3		R	29.8 N 114.0 W
		e		21	02.7		1.5			Gulf of California
		e		22	09.7		2.0			h about 74 km
	LPE	eS		23	35	999				0 = 14 17 43.8
	BBN	e			58		10.0			Mag. 5-1/2 (Pas), 6 (Pal)
		eSur		24	53.7		2.8			Very strong surface waves on all systems

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
31 May		eP	14	50	56.0	9	0.6		T	48.9 N 154.5 E
		e		51	09.7		0.6			Kurile Islands
										h about 50 km
										0 = 14 39 20.4
31 May		eP	15	39	30.5	8	1.4		T	
		e		40	34.0		1.0			
	E	e		43	32.9		1.0			
		e(Sur)			39.7		3.0			
	LPE	e			55		15.0			
		e		44	06.9		3.2			
	LPN	e			53		15.0			
	BB	e		45	15		9.0			
	BB	e		46	30		7.0			
31 May		eP	15	58	03.7	3	1.0		R	
		eSur	16	02	02.5		1.0			
31 May		eP	16	06	38.5	2	0.6		T	
31 May		eP	16	42	35.7	5	1.1		T	
		e			46.1		1.2			
31 May		eP	19	30	23.5	2	0.8		T	5.3 S 151.6 E
		e		34	40.0		1.0			New Britain
		e		35	14.0		1.2			h about 56 km
	LPE	eSur	20	02	00					0 = 19 15 57.0
	LP	eSur		07	13					Mag. 5-1/2 - 5-3/4 (Pal)
										Strong surface on LP and BB
31 May		eP	19	45	41.6	3	1.0		T	
		e			51.0		1.0			
31 May		eP	21	32	11.8	3	1.0		T	
		e(Sur)		36	03.2		1.0			
		e			56.8		1.0			

WICHITA MOUNTAINS SEISMOLOGICAL OBSERVATORY
FORT SILL, OKLAHOMA, U.S.A.

Operated under the Technical Supervision of the
Air Force Technical Applications Center (AFTAC)

By

The Geotechnical Corporation, Garland, Texas

B. B. Leichliter, Chief Seismologist

REPORT ON THE REGISTRATION OF EARTHQUAKES FOR JUNE 1961

Volume 1, No. 6

By Robert C. Shopland, Project Engineer;

Seismograms read by Gayle Stanfill and Cecil Morgan

Advanced Research Projects Agency (ARPA)
DEPARTMENT OF DEFENSE
UNITED STATES GOVERNMENT

THE REGISTRATION OF EARTHQUAKES

AT THE

WICHITA MOUNTAINS SEISMOLOGICAL OBSERVATORY

STATION

Station Abbreviation: WMSO
Station Identification on Film Seismograms: a
Geographical Location*: 34° 43' 05.3" N. Lat.
(Vault No. 6) 98° 35' 20.7" W. Long.

GEOCENTRIC LOCATION*: 34° 32' 09.8" N. Lat.
(Vault No. 6) 98° 35' 20.7" W. Long.

ALTITUDE (Meters)*: 505 Meters (1658 feet)
(Vault No. 6)

GEOLOGY: The station is located on the Carlton (porphyritic) granophyre of the Wichita Mountains of Oklahoma.

NOISE LEVEL - June 1961: The periods of the predominant microseisms at WMSO are 0.5 second and 6 seconds. An amplitude distribution curve for the 0.5 second microseisms may be found on page 2.

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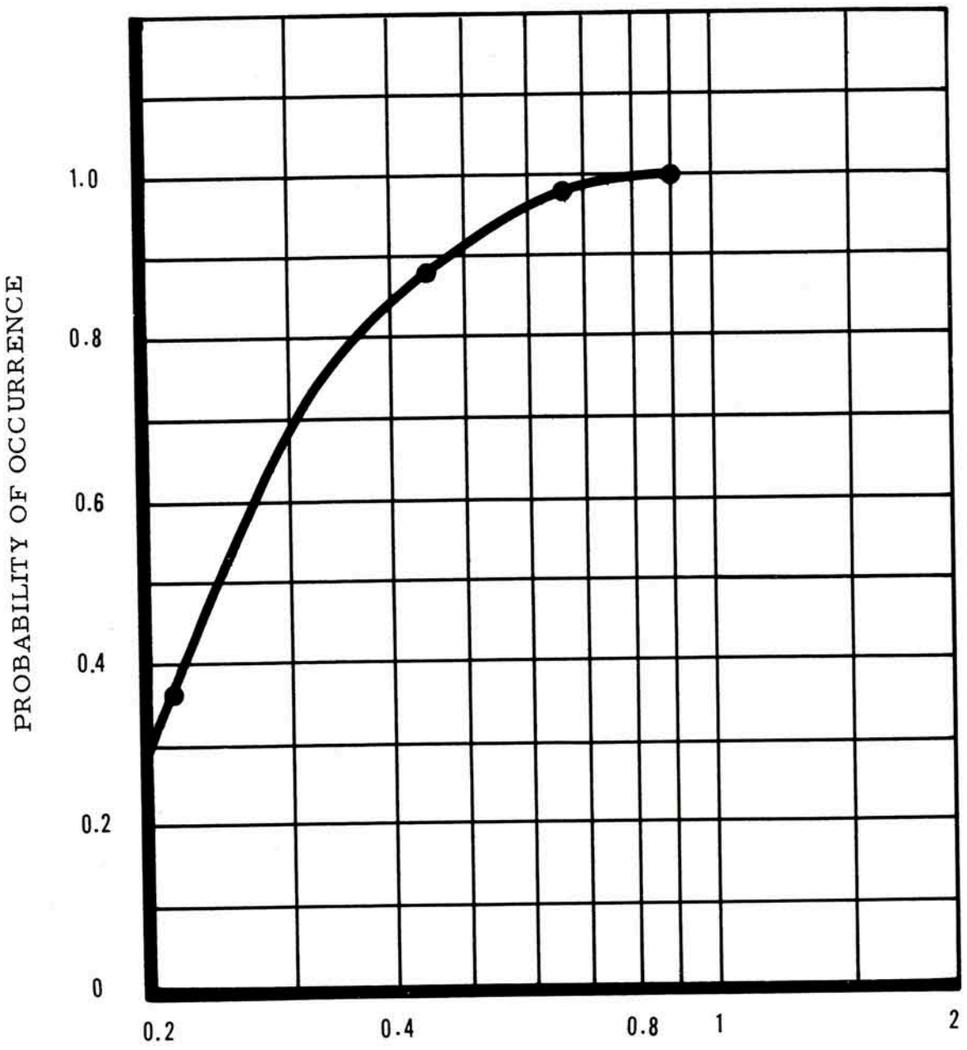
* The coordinates refer to the location of vault no. 6 which houses the 3-component groups of short-period and intermediate band seismometers from which arrival times are determined.



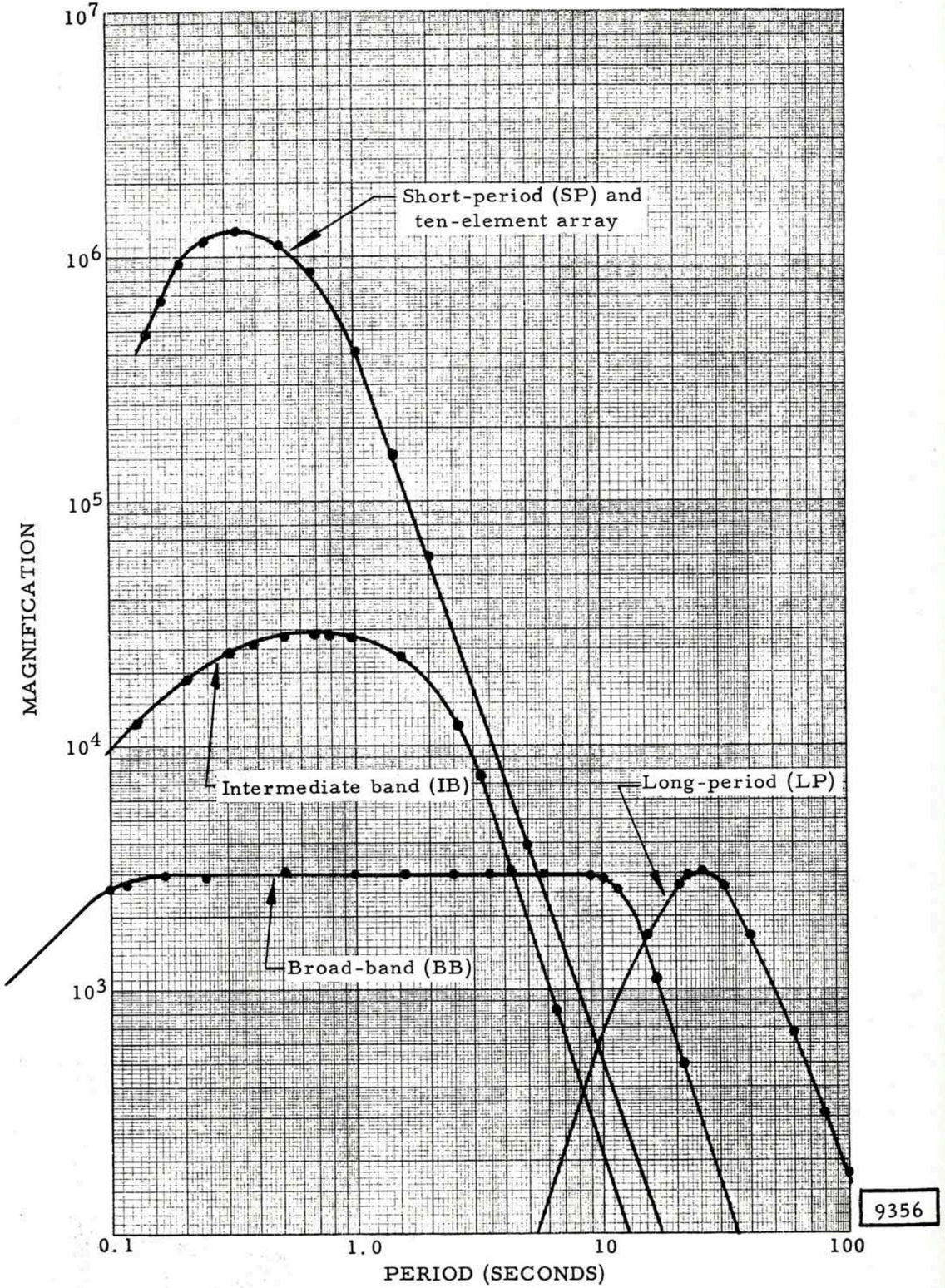
Probability of predominant 0.5-sec microseisms occurring at or less than a given amplitude at Unity magnification

SEISMOGRAPHS

	Ts	λs	Tg	λg	σ^2
SP Vertical Benioff	1.0	1.0	0.2	1.0	0.01
SP Horizontal Benioff	1.0	1.0	0.2	1.0	0.01
IB Vertical Melton	2.5	0.65	0.64	1.5	0.002
IB Horizontal Sprengnether	2.5	0.65	0.64	1.5	0.0005
BB Vertical Press-Ewing	12.5	0.4	0.64	9.0	0.0002
BB Horizontal Sprengnether	12.5	0.4	0.64	9.0	0.0004
LP Vertical Sprengnether	25.0	1.0	30	1.0	0.004
LP Horizontal Sprengnether	25.0	1.0	30	1.0	0.004

SP = Short Period
IB = Intermediate Band
BB = Broad Band
LP = Long Period
Ts = Free Period of seismometer in secs.
λs = Damping constant of seismometer
Tg = Free Period of galvanometer in secs.
λg = Damping constant of galvanometer
σ^2 = Coupling Coefficient

NOTE: Response curves may be found on page 4.



Response characteristics of seismographs

INTERPRETATION OF SYMBOLS

1. Earthquakes Listed

All local (L), near-regional (NR), regional (R), and distant earthquakes (T) are tabulated on the following pages.

2. System

In the column headed "Syst." (system), the seismograph (SP, IB, BB, or LP) and component (Z, N, or E) used to measure arrival time are designated. When no component designation appears, the phase is read from the vertical component. When neither system nor component designation appears, the phase is read from the SP vertical component.

3. Phase

(1) "i" (impetus) preceding a phase designates sudden beginning of the motion. (A designation of "i" in the case of initial P motion indicates a signal-to-noise ratio exceeding about 5/1).

(2) "e" (emersio) designates gradual beginning.

(3) "i" or "e" alone designates an unidentified phase.

(4) ( ) (parenthesis marks) indicate uncertainty.

4. Time

(1) Date and arrival time are given in Greenwich Civil Time (G. C. T.)

(2) The arrival time is reported as the earliest time on Z, N, or E. Single Z rather than the array summation ($\sum$) is used for measuring arrival times on the SP seismographs.

5. Ground Motion

(1) In the columns headed "A" and "T" are tabulated earth displacement in millimicrons and period in seconds, respectively. An amplitude of 999 indicates that a signal cannot be measured reliably. A "c" or "d" in the "A" column indicates compression or dilation, respectively, of the ground as indicated by the vertical component instrument.

The value of "A" for P phases is the maximum amplitude in the first ten seconds. All amplitudes are center-to-peak amplitudes.

(2) Trace amplitudes are measured to the nearest 1/2 millimeter at X10 view.

6. Direction

In the column headed "Dir." (direction), the direction of the epicenter as viewed from WMSO is indicated. For teleseisms, direction is obtained only from P and Rayleigh waves and is listed opposite the phase from which it is obtained. For close events, direction may be obtained from P-wave step-out shown on the individual short-period vertical traces.

7. Type

Earthquakes are identified as either:

L	(local)	0°	-	1.4°
NR	(near-regional)	1.4°	-	6°
R	(regional)	6°	-	16°
T	(teleseismic)	16°	-	180°

8. Remarks Column

(1) Epicentral locations, time of origins, depth of foci, and magnitudes are obtained from the U.S. Coast and Geodetic Survey Preliminary Determination of Epicenters cards.

(2) The nature of the surface waves is indicated subjectively.

(3) Epicentral locations and distances reported by the station are accompanied by an indication of the phases used to determine epicentral distance, e.g. $\triangle$(S-P) = 6°, Central Colorado.

(4) Operational notes refer to operational difficulties that affect analysis of data.

DATE	Syst.	Phase	Arrival Time G.C.T.	Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h. m. s.					
01 Jun		eSur	00 46 53.0		3.0		T	Weak surface waves on
	LP	eSur	47 10					SP, LP and BB
	BB	eSur	48 18					
01 Jun		eP	03 38 34.8	2	0.6		T	Near east coast of
		ePcP	39 06.3		0.6			Kamchatka
								55.3 N 161.7 E
								h about 25 km
								0 = 03 27 39.5
01 Jun		eP	06 10 40.2	1	0.6		T	
01 Jun		eP	08 10 31.2	1	0.6		T	Kurile Islands
								44.1 N 148.2 E
								h about 67 km
								0 = 07 58 21.5
01 Jun		eP	08 52 49.0	9	0.5	SE	T	
		e	53 10.0		0.6			
01 Jun		eSur	09 58 50.8		2.7		T	Weak surface waves on
	LP	eSur	59 05					SP, LP and BB
	BB	eSur	10 00 18					
01 Jun		eP	10 08 51.0	1	0.8		T	Near coast of Dominican
	LPN	eS	13 50		10.0			Republic
	LPN	eScS	19 10		19.0			19.5 N 69.3 W
	BB	eSur	23 46					h about 53 km
								0 = 10 02 45.1
								Strong surface waves
								on BB and LP
								Weak surface on SP
								LPZ inoperative
01 Jun		eP	12 12 24.8	4	1.2		T	
		e	42.2		1.2			
01 Jun		eP	13 09 55.1	11	0.5		T	

DATE	Syst.	Phase	Arrival Time G.C.T.	Ground Motion A	T	Dir.	Type	Remarks
1961			h. m. s.					
01 Jun		eP	13 51 27.0	1	0.5		T	
01 Jun		eP	15 54 27.2	999			NR	△(S-P) = 1.9°
		eS	51.2	999				
01 Jun		eP	16 31 40.3	2	0.9		T	
01 Jun		eP	16 45 10.0	1	0.7		T	Southern Turkey 37.7 N 36.8 E h about 60 km 0 = 16 31 43.8
01 Jun		eP	18 00 28.3	2	0.6		T	Kamchatka 54.5 N 161.7 E h about 25 km 0 = 17 49 29.8
01 Jun		eP	23 28 08.5	3	0.2		NR	△(S-P) = 1.7°
	E	eS	30.2	999				
01 Jun		eP'	23 48 11.2	3	0.9		T	Ethiopia 10.6 N 39.3 E h about 51 km 0 = 23 29 21.1 Strong surface waves on LP Medium surface waves on BB Weak surface on SP and IB
		e	19.3		1.0			
	IB	ePP	49 38		2.8			
	BBE	e	56 54		7.0			
	LPN	e(SKKKS)	57 00		16.0			
	LPE	e	52		17.0			
		ePKKP	58 20.0		1.0			
	LP	e	32		22.0			
	LPN	e(PS)	59 53		22.0			
02 Jun	LPN	ePPS	00 01 00		22.0			
		e	23.8		1.4			
	IB	e	05 54		3.0			
	BB	e	06 15		11.0			
	LPN	e	10 20		24.0			
	LPN	e	14 50		24.0			
	LPE	eSur	19 15					
	LPE	eSur	22 00					
	LP	eSur	30 00					

DATE	Syst.	Phase	Arrival Time G.C.T.	Ground Motion A	T	Dir.	Type	Remarks
1961			h. m. s.					
02 Jun		eP'	00 15 41.1	2	1.0		T	Ethiopia 10.0 N 39.6 E h about 60 km 0 = 23 56 48.6
02 Jun		eP'	00 20 37.8	4	0.9		T	Ethiopia 10.5 N 39.5 E h about 29 km 0 = 00 01 45.4
02 Jun		eP'	00 27 48.0	3	0.8		T	Ethiopia 10.3 N 39.6 E h about 64 km 0 = 00 08 59.8
		e	29 01.0		1.1			
02 Jun		eP	00 28 03.2	1	0.4		NR	△(S-P) = 1.7°
	E	eS	25.1		0.5			
02 Jun		eP	00 40 14.9	2	0.8		T	
02 Jun		eP	01 16 47.8	1	0.7		T	
02 Jun		eP'	01 35 06.3	1	0.7		T	Ethiopia 9.7 N 39.7 E h about 60 km 0 = 01 16 10.6
02 Jun		eP	01 46 20.5	1	0.6		T	
		e	29.2		0.7			
		e	35.2		0.7			
		e	47 11.1		0.6			
02 Jun		eP	02 31 58.5	2	1.0		T	

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
02 Jun		eP'	05	10	05.4	26	1.0		T	Ethiopia
	LP	ePP		11	27		20.0			9.8 N 40.0 E
		e		12	27.3		1.6			h about 41 km
	LP	e			55		22.0			0 = 04 51 10.4
		eSKP		13	24.8		0.9			Strong surface on LP
		e		16	10.8		1.0			and BB
	LPN	eSKS		17	07		21.0			Weak surface waves on
		e		18	07.5		1.0			SP and IB
	LPN	eSKKS			40		18.0			
	LPE	e		19	35		15.0			
		ePKKP		20	10.9		0.9			
		eScSP		21	01.6		0.9			
	LPN	ePS			32		20.0			
	LPN	ePPS		22	55		22.0			
		e		23	06.0		1.8			
	LP	e		26	35		24.0			
	LPE	eSS		27	51		27.0			
	LPN	e		37	00		20.0			
	LPE	eSur		41	45					
	LPE	eSur		44	00					
	LP	eSur		50	00					
02 Jun		eP'	05	41	22.8	7	1.0		T	Ethiopia
		ePP		42	45.7		1.8			10.3 N 39.6 E
		e		52	15.3		0.6			h about 26 km
		ePKKP			33.5		0.7			0 = 05 22 29.1
02 Jun		eP'	06	03	45.9	7	1.0		T	Ethiopia
		e		04	33.1		1.0			10.3 N 39.8 E
		e			54.2		1.3			h about 31 km
		e		05	42.3		1.3			0 = 05 44 52.4
		ePKKP		13	52.6		0.8			
02 Jun		eP'	06	36	05.5	2	0.7		T	Ethiopia
										10.5 N 39.7 E
										h about 36 km
										0 = 06 17 13.3

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
02 Jun		eP'	07	21	41.4	7	1.0		T	Ethiopia
										10.3 N 40.0 E
										h about 54 km
										0 = 07 02 52.4
02 Jun		eP	07	40	38.3	3	0.8		T	
02 Jun		eP	11	16	37.6	5	1.1		T	Svalbard region
										79.3 N 4.9 E
										h about 25 km
										0 = 11 06 41.3
02 Jun		eP	12	19	02.6	1	0.6		NR	$\triangle$(S-P) = 4.2°
	N	eS			51.9		0.6			
02 Jun		eP	13	00	02.3	1	0.6		T	Off coast of Chile
										40.0 S 75.2 W
										h about 25 km
										0 = 12 48 04.6
02 Jun		eP	15	11	08.2	4	1.0		T	
02 Jun		eP	17	34	14.3	2	0.4		NR	$\triangle$(S-P) = 1.9°
	E	eS			38.0		0.5			
02 Jun		eP	18	22	57.8	1	0.8		T	Mariana Islands region
		ePP		26	54.6		1.4			21.3 N 145.9 E
										h about 42 km
										0 = 18 09 25.9
02 Jun		eP	18	33	56.2	4	0.8		T	Near coast of Ecuador
		e		34	09.7		1.0			2.9 S 79.9 W
		ePcP		35	53.8		0.8			h about 25 km
		e		36	06.0		0.9			0 = 18 26 08.9
	BBN	eS		40	10		5.0			Weak surface waves on LP
	LP	eSur		43	00					
	LP	eSur		47	00					

DATE	Syst.	Phase	Arrival Time G.C.T.	Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h. m. s.					
02 Jun		eP	20 48 15.2	2	0.3		NR	△(S-P) = 2.7°
	E	eS	48.1		0.9			
02 Jun		eP	23 31 25.9	2	0.2		NR	△(S-P) = 1.7°
		e	35.7		0.4			
	E	eS	47.2		0.5			
02 Jun		eP	23 51 28.3	1	0.7		T	
03 Jun		eP	01 24 08.6	14	0.8		T	Off coast of Kamchatka
		e	17.7		0.8			56.1 N 164.8 E
	LPE	eS	32 57		18.0			h about 29 km
	LPE	e	37 44		20.0			0 = 01 13 25.4
	LPE	eSur	40 00					Strong surface waves
	LPN	eSur	46 05					on LP
								Medium surface waves
								on BB
03 Jun	LPE	eSur	04 13 00				T	New Hebrides Islands
								17.7 S 167.6 E
								h about 31 km
								0 = 03 18 30.2
03 Jun		eP	04 31 51.7	1	0.7		T	Chile-Peru border
		e	32 53.7		0.9			18.0 S 70.3 W
								h about 60 km
								0 = 04 21 56.2
03 Jun		eP	06 59 51.1	2	0.7		T	
03 Jun		eP	11 31 17.1	4	0.9		T	
03 Jun		eP	14 18 21.5	2	0.8		T	
03 Jun		eP'	15 39 19.6	2	0.9		T	Ethiopia
								9.7 N 39.7 E
								h about 60 km
								0 = 15 20 24.6

DATE	Syst.	Phase	Arrival Time G.C.T.	Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h. m. s.					
03 Jun		eP'	15 42 11.4	4	1.0		T	Ethiopia
								9.8 N 39.8 E
								h about 50 km
								0 = 15 23 16.6
03 Jun		eP	16 29 18.7	3	0.4		R	SP horizontals
		e	30 57.5		0.6			inoperative
		eSur	32 02.4		0.7			
03 Jun		eP'	18 02 21.7	1	0.5		T	Northern Celebes
		e	58.1		0.6			0.3 N 123.8 E
		e	05 29.2		1.0			h about 88 km
		e	09 03.0		0.7			0 = 17 43 21.5
03 Jun		eP	20 12 55.5	1	0.5		R	
	E	eSur	14 26.2		0.6			
03 Jun		eP	20 34 26.1	1	0.4		NR	△(S-P) = 4.4°
	N	eS	35 17.5		0.7			
03 Jun		eP	20 45 55.8	5	1.3		T	South of Samoa Islands
								16.1 S 172.9 W
								h about 60 km
								0 = 20 33 13.4
03 Jun		eP	21 35 11.5	5	1.0		T	
		e	36 07.5		0.8			
04 Jun		eP	00 25 44.2	999			L	△(S-P) less than .1°
	E	eS	48.2	999				
04 Jun		eP	01 26 15.3	1	0.9		T	
04 Jun		eP	07 47 41.9	31	2.2		T	Tibet
		e	51 14.2		1.1			33.8 N 81.8 E
		eP'	36.9	4	1.1			h about 46 km
		ePP	52 05.4		1.3			0 = 07 33 05.4
	BBN	eSKS	58 13		9.0			Strong surface waves
	LPE	ePS	08 02 00		14.0			on LP and BB

(cont'd. on next page)

DATE	Syst.	Phase	Arrival Time G.C.T.			Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h.	m.	s.					
04 Jun		ePKKP			32.1		1.1			(continued from preceding page)
	BBN	ePPS			35		9.0			
		eSKKP		06	35.2		2.2			Weak surface waves on
	LP	e		15	03		30.0			SP and IB
	LP	e		19	05		20.0			Initial arrival is P diffracted
	LPE	eSur		24	20					
	LP	eSur		40	15					
04 Jun		eP	08	13	11.9	4	1.1		T	
04 Jun		eP	09	08	01.6	3	1.0		T	
04 Jun		eP	10	44	12.6	8	1.1		T	
04 Jun		eP	11	08	34.5	1	0.6		T	
04 Jun		eP	11	30	26.6	2	0.9		T	
05 Jun		eP	15	56	26.2	11	1.3		T	
05 Jun		eP	21	26	44.7	2	0.3		NR	$\triangle$(S-P) = 1.8°
	N	eS		27	06.8		0.5			
06 Jun		eP	00	40	51.0	2	0.6		T	Leeward Islands
		e		43	09.6		0.9			17.6 N 60.9 W
										h about 50 km
										0 = 00 33 38.2
06 Jun		eP	01	50	52.2	1	0.6		T	
06 Jun		eP	02	25	32.2	1	0.9		T	
06 Jun		eP	03	51	27.8	36	1.2		T	Off coast of Oregon
		e			34.0		0.9			43.4 N 127.7 W
		e			39.0		1.2			h about 25 km
		e			48.6		1.0			0 = 03 46 08.6
	LPN	e(S)		55	55		26.0			Weak surface waves
	LP	eSur		58	15					on LP

DATE	Syst.	Phase	Arrival Time G.C.T.			Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h.	m.	s.					
06 Jun		eP	07	05	55.7	5	1.0		T	
06 Jun		eP	08	24	31.7	3	1.1		T	Tonga Islands region
		e			51.7		1.1			15.5 S 173.6 W
		e		25	06.7		1.0			h about 117. km
										0 = 08 11 54.7
06 Jun		eP	09	42	15.3	5	1.3		T	
06 Jun		eP	12	37	42.7	2	0.8		T	
06 Jun		eP	12	53	47.5	2	0.7		T	
		e		54	43.4		0.7			
06 Jun		eP	20	42	58.9	1	0.4		NR	$\triangle$(S-P) = 4.3°
		eS		43	49.5		0.7			
06 Jun		eP	21	17	01.3	2	1.0		T	
06 Jun		eP	23	38	51.2	1	0.4		NR	$\triangle$(S-P) = 1.8°
	E	eS		39	13.5		0.5			
07 Jun		eP	01	42	38.3	6	1.0		T	
07 Jun		eP	05	15	09.5	2	1.0		T	Kurile Islands
		e			23.5		1.1			45.3 N 150.8 E
										h about 61 km
										0 = 05 03 10.7
07 Jun		eP	13	18	20.0	4	1.0		T	Korea - China border
										42.8 N 130.5 E
										h about 300 km
										0 = 13 05 51.2

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
07 Jun		eP	14	28	22.6	187	2.0		T	Ascension Island region
		e(PP)		31	58.0		2.0			5.4 S 11.6 W
	LPE	eSur		54	45					h about 17 km
	LP	eSur		57	52					0 = 14 15 18.9
										Mag. 5-1/4 - 5-1/2 (Pal)
										Strong surface waves on LP
										Medium surface waves on BB
										LPN and BBN inoperative
07 Jun		eP	15	51	39.9	1	0.6		T	Santa Cruz Islands
										10.7 S 166.3 E
										h about 209 km
										0 = 15 38 13.1
07 Jun		eP	17	29	31.1	2	0.4		R	
		eSur		31	40.0		0.6			
07 Jun		eP	17	36	49.8	1	0.6		T	
07 Jun		eP	21	52	20.1	1	0.3		NR	△(S-P) = 3.2°
		e			27.1		0.3			
	E	e			28.0		0.5			
	E	eS			58.3		0.4			
	E	eSur		53	07.0		0.5			
07 Jun		eP	23	07	24.8	1	0.7		T	Samoa Islands region
		e			42.9		0.7			15.9 S 172.9 W
										h about 25 km
										0 = 22 54 43.5
08 Jun		eP	07	56	47.9	1	0.6		T	
08 Jun		eP	08	37	45.5	1	0.6		T	
08 Jun		eP	09	07	14.5	3	1.0		T	Samoa Islands region
		e			35.6		1.0			15.4 S 172.6 W
										h about 88 km
										0 = 08 54 38.6

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
08 Jun		eP	11	00	45.8	1	0.6		T	
08 Jun		eP	11	56	05.6	3	1.0		T	
08 Jun		eP	12	28	56.4	2	0.4		NR	△(S-P) = 1.7°
		e		29	06.1		0.5			
	E	eS			18.2	999				
08 Jun		eP	15	02	23.0	3	1.0		T	
08 Jun		eP'	16	03	11.8	2	0.8		T	Flores Sea
		e			56.2		1.2			8.1 S 121.7 E
		ePP		05	51.0		1.8			h about 25 km
		e		06	23.0		1.4			0 = 15 44 01.0
08 Jun		eP	18	33	30.4	2	0.3		NR	△(S-P) = 1.7°
		eS			51.7	999				
08 Jun		eP	21	37	23.8	2	0.4		NR	△(S-P) = 1.7°
		eS			45.5	999				
09 Jun		eP	05	47	44.9	1	1.0		T	
09 Jun		eP	06	01	19.4	6	1.0		T	Near coast of Ecuador
		e			25.5		1.0			0.4 N 80.2 W
		ePcP		03	31.0		0.8			h about 15 km
	LPN	e		10	00		20.0			0 = 05 53 56.4
										LPZ and LPE inoperative
09 Jun		eP	06	33	11.4	1	0.9		T	
09 Jun		eP	09	50	32.1	6	0.7		T	Caspian Sea
		e			48.6		0.7			40.8 N 50.7 E
		ePKKP	10	06	51.9		0.8			h about 17 km
		e		07	18.5		1.1			0 = 09 36 49.2
										LP, BB and IB systems inoperative

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
09 Jun		eP[1]	15	37	03.4	3	1.0		T	Near coast of Sumatra
		e			35.0		0.7			5.5 N 95.8 E
		e		39	55.0		0.9			h about 100 km
		ePP		40	10.5		1.2			0 = 15 17 50.7
		eSKP			31.0		2.0			
09 Jun		e(P)	19	11	47.3	3	1.0		R	
		eSur		12	46.4		3.0			
		eSur		13	08.5		3.0			
09 Jun		eP	21	30	34.5	3	0.9		T	
10 Jun		eP	00	28	31.8	1	0.6		T	
		e			58.6		0.6			
10 Jun	N	eSur	02	25	06.0		3.6		T	
10 Jun		eP	06	04	24.1	2	0.7		T	Near south coast of Kamchatka
										48.9 N 157.9 E
										0 = 05 53 00.6
10 Jun		eP	06	11	07.2	1	0.6		T	
10 Jun		eP	06	47	38.8	1	0.5		T	
		e			47.6		0.6			
10 Jun		eP	07	16	35.4	12	0.8	SE	T	
		e			44.5		0.8			
		e		17	08.4		0.8			
10 Jun		eP	08	25	05.9	3	0.7	NW	T	
		e			17.0		0.7			
10 Jun		eP	08	57	39.8	70	1.5		T	South of Mexico
		e		58	24.4		1.6			8.1 N 103.4 W
	LP	ePP			28		16.0			h about 25 km
		ePcP	09	01	03.2		1.3			0 = 08 52 01.1
	LP	e			43		19.0			Mag. 4-3/4 - 5 (Pal)
	LPN	eS		02	18		23.0			LPE inoperative
	LPN	eSur		04	00					Strong surface waves
	LP	eSur		05	14					on all systems

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
10 Jun		eP	09	09	30.6	3	1.0		T	
		e		10	03.0		1.0			
		e			18.2		1.0			
10 Jun		eP	09	11	09.1	1	0.6		T	
10 Jun		eP	09	21	59.2	6	1.0		T	Easter Island region
										24.0 S 111.4 W
										h about 25 km
										0 = 09 11 51.8
10 Jun		eP	09	49	42.8	1	1.0		T	
10 Jun		eP	11	42	09.9	1	1.0		T	Andreanof Islands, Aleutian Islands
										51.2 N 179.0 W
										h about 28 km
										0 = 11 32 13.5
10 Jun		eP	11	56	06.5	12	1.1		T	San Juan Province, Argentina
		e(PcP)			26.8		0.8			32.0 S 70.3 W
										h about 83 km
										0 = 11 44 49.8
10 Jun		eP	14	48	59.6	3	0.8	SE	T	
10 Jun		eP	14	59	46.7	1	0.6	SE	T	
10 Jun		eP	15	28	13.5	2	0.8		T	
10 Jun		eP	16	00	53.3	35	0.8	SSE	T	
		e		01	05.1		0.8			
10 Jun		eP	16	03	38.6	4	0.8	SE	T	
		e			46.5		0.8			
		e			56.5		1.8			
10 Jun		eP	16	10	31.3	1	0.7		T	
10 Jun		eP	16	14	19.1	1	0.6		T	
		e			23.7		0.6			

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
10 Jun	LP	eSur	16	38	15				T	Weak surface waves on LP
10 Jun		eP	16	47	00.7	13	0.8	SE	T	
		e			11.3		0.8			
10 Jun		eP	16	51	19.1	2	0.8		T	
10 Jun		eP	17	44	50.7	1	0.6		T	Weak surface waves on LP
	LP	eSur	18	05	00					
10 Jun		eP	18	19	32.1	9	0.8	SE	T	
10 Jun		eP	19	17	28.4	1	0.6		T	
10 Jun		eP	20	08	16.1	1	0.4		NR	$\triangle$(S-P) = 4°
	E	eS		09	02.8		0.6			
10 Jun		eP	20	41	54.9	36	1.0		T	Easter Island region
	IB	e(PP)		43	58		3.5			24.1 S 112.1 W
	BB	e(PP)		44	02		6.0			h about 47 km
	LPN	eS		50	14		27.0			0 = 20 31 50.9
	LPN	eSS		53	53		27.0			Mag. 6 (Pas), 5-1/2 -
	LPN	eSur		58	40					5-3/4 (Pal)
	LP	eSur	21	00	30					LPE inoperative
	LP	eSur		02	00					Strong surface waves
		eSur		03	00.0					on LP and BB
										Medium on IB.
										Weak on SP.
11 Jun		eP	01	09	38.4	3	1.0		T	
11 Jun		eP	01	22	44.2	2	1.1		T	
		e		23	02.8		1.2			
11 Jun		eP	04	13	55.8	1	0.6		T	Kamchatka
		e		14	17.3		0.7			51.4 N 159.2 E
		e			40.9		0.6			h about 24 km
										0 = 04 02 41.3
11 Jun		eP	04	51	44 7	1	1.0		T	

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
11 Jun		eP	05	04	45.2	3	1.0		T	
11 Jun		eP	05	25	10.0	2	0.9		T	Southern Iran
		e			20.0		0.9			28.9 N 54.6 E
		e		28	37.2		1.0			h about 38 km
		eP'		29	03.7	10	0.7			0 = 05 10 26.0
	BB	ePP			50		7.0			Mag. 6-1/2 - 6-3/4 (Pas),
	LPN	eSKS		35	49		25.0			6-1/4 - 6-1/2 (Pal)
	LPN	ePS		39	33		31.0			LPE inoperative
		ePKKP			57.7		0.7			Strong surface waves
	BB	ePSP		40	27		11.0			on LP and BB
	LPN	eSS		45	45		47.0			Weak surface on SP and IB
	LP	eSSS		49	41		27.0			Initial arrival is P diffracted
	LP	eSKKKS		50	50		38.0			
	LP	eSur	06	02	00					
11 Jun		eP'	05	48	46.2	2	0.7		T	Southern Iran
		ePKKP		59	40.5		0.6			27.3 N 54.5 E
										h about 25 km
										0 = 05 30 05.9
11 Jun		eP	06	04	07.1	2	0.6		T	Near south coast of
		e			18.4		0.6			Kamchatka
		e		07	08.0		1.0			51.4 N 159.3 E
										h about 18 km
										0 = 05 52 51.7
11 Jun		eP	07	06	02.2	1	0.5		T	
11 Jun		eP	09	40	36.6	3	1.0		T	
11 Jun		eP	10	28	44.9	3	0.9		T	North Atlantic Ocean
	LP	eSur		46	20					46.6 N 27.4 W
										h about 22 km
										0 = 10 19 23.6
										Weak surface waves on LP
										LPE inoperative
11 Jun		eP	12	24	20.0	2	0.8		T	

DATE	Syst.	Phase	Arrival Time G.C.T.			Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h.	m.	s.					
11 Jun		eP	12	46	16.3	2	0.9		T	Iran
		eP'		50	03.9	2	0.8			28.0 N 54.6 E
		ePP			42.1		1.2			h about 36 km
	LPN	ePS	13	00	27		19.0			0 = 12 31 26.8
		ePKKP			59.9		0.8			LPE inoperative
	LPN	ePPS		01	35		20.0			Medium surface waves
	LPN	e		10	30		26.0			on LP
	LPN	eSur		24	40					Initial arrival is
	LP	eSur		28	30					P diffracted
11 Jun		eP'	12	49	02.4	2	0.9		T	Iran
										27.5 N 54.4 E
										h about 56 km
										0 = 12 30 21.3
11 Jun		eP	13	59	50.2	3	0.8		T	
11 Jun		e(P)	14	16	09.4	1	0.8		T	Southern Iran
		eP'			32.5	6	1.1			27.6 N 54.6 E
		e		19	41.3		1.1			h about 63 km
		ePKKP		27	31.5		1.1			0 = 13 57 58.6
	LP	eSur		55	00					LPE inoperative
										Weak surface waves on LP
										Initial arrival is P diffracte
11 Jun		eP	17	06	22.3	5	1.0	SSE	T	
11 Jun		eP	17	17	33.0	2	0.9		T	
11 Jun		eP	17	44	37.2	2	0.8		T	
11 Jun		eP	17	54	25.8	2	0.9		T	Medium surface waves
	LP	eSur	18	12	40					on LP
11 Jun		eP	18	22	36.2	3	1.0		T	
11 Jun		eP	20	54	06.1	1	0.5		T	Near south coast of
		e			54.1		0.6			Kamchatka
										51.3 N 159.5 E
										h about 43 km
										0 = 20 42 52.4

DATE	Syst.	Phase	Arrival Time G.C.T.			Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h.	m.	s.					
11 Jun		eP	22	34	44.2	2	0.8		T	
12 Jun		eP	00	18	33.3	9	1.0	SSW	T	Δ(S-P) = 18°
		e			43.0		1.1			Strong surface waves on
		e		19	51.0		0.8			all systems
		e		21	41.0		1.5			LPE inoperative
	LPN	e(S)			50		20.0			
	LP	eSur		23	08					
	E	eSur			30.0					
	LP	e		29	25		14.0			
12 Jun		eP	05	16	30.4	1	0.4		R	
		e			37.9		0.6			
		e			46.1		0.6			
		e			54.4		0.6			
	E	e		17	50.0		0.5			
		e		18	17.5		0.5			
	N	eSur			31.0		0.6			
12 Jun		eP'	07	14	06.9	1	1.0		T	Off south coast of Java
										9.2 S 110.4 E
										h about 44 km
										0 = 06 54 39.5
12 Jun		eP	07	54	14.6	2	0.7		T	
12 Jun		eP'	10	17	04.5	2	1.1		T	North Viet-Nam
		e		18	12.3		1.0			21.5 N 106.0 E
		ePKKP		27	15.9		0.8			h about 55 km
										0 = 09 58 17.6
12 Jun		eP	11	57	05.0	1	0.6		T	
		e		58	02.0		0.6			
12 Jun		eP	12	10	15.7	3	1.0		T	
		e			22.0		1.0			
12 Jun		eP	14	35	45.3	1	0.8		T	

DATE	Syst.	Phase	Arrival Time G.C.T.			Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h.	m.	s.					
12 Jun		eP	17	39	00.2	2	0.6		T	
		e			14.1		0.6			
12 Jun		eP	17	45	22.3	2	0.8		T	
12 Jun		eP	18	24	09.2	2	0.3		NR	△(S-P) = 1.7°
		e			19.5		0.3			
		eS			31.0	999				
12 Jun		eP	20	48	56.2	2	0.8		T	
12 Jun		eP	23	38	07.4	3	0.2		NR	△(S-P) = 1.6°
		e			17.4		0.4			
		eS			28.3	999				
13 Jun		eP	02	19	26.2	4	0.2		NR	△(S-P) = 1.7°
		e			36.2		0.4			
		eS			48.0	999				
13 Jun		eP	02	34	05.6	10	1.2		T	Andreanof Islands, Aleutian Islands
		e			18.9		1.0			51.9 N 176.5 W
		ePcP		35	04.4		0.7			h about 56 km
	LP	eSur		51	00					0 = 02 24 25.9
										Weak surface waves on LP
										LPE and IBN inoperative
13 Jun		eP	04	41	44.5	2	0.9		T	
13 Jun	LP	eSur	08	03	00				T	South Atlantic Ocean
										22.6 S 12.5 W
										h about 37 km
										0 = 07 15 58.2
										Medium surface waves on LP
										LPE inoperative
13 Jun		eP	11	11	45.8	1	1.0		T	

DATE	Syst.	Phase	Arrival Time G.C.T.			Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h.	m.	s.					
13 Jun		eP'	12	14	56.0	1	0.8		T	Celebes
		e		18	13.1		1.0			0.0 121.5 E
										h about 20 km
										0 = 11 55 44.1
13 Jun		eP	13	42	31.9	999			T	Near coast of Costa Rica
		e			40.7		0.7			8.6 N 83.2 W
										h about 43 km
										0 = 13 36 29.4
13 Jun		eP	14	24	33.5	2	0.8		T	
13 Jun		eP	14	33	49.8	3	1.0		T	
13 Jun	LP	eSur	18	00	00				T	Medium surface waves on LP
										LPE inoperative
13 Jun		eP	18	12	47.2	4	0.2		NR	△(S-P) = 1.7°
		e			56.8		0.4			
		eS		13	09.0	999				
13 Jun		eP	18	32	01.8	2	0.2		NR	△(S-P) = 2.2°
	N	eS			28.2		0.3			
13 Jun		eP	21	18	48.4	999			NR	△(S-P) = 1.7°
		e			58.4	999				
		eS		19	09.6	999				
13 Jun		eP	21	50	52.8	35	0.8		T	Tonga Islands region
		epP		51	31.0		1.2			21.4 S 176.4 W
	BBE	eSKS	22	01	14		7.0			h about 146 km
	LPN	eSKS			18		12.0			0 = 21 37 55.0
	E	eS			48.0		2.0			LPZ, LPE, and SPN inoperative
	BBN	eS			50		7.0			
	BBE	e		02	38		8.0			
		ePKKP	22	08	05.9		0.8			
		e			41.4		1.5			

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
13 Jun		eP	23	51	32.6	1	0.3		NR	△(S-P) = 1.7°
		e			42.0		0.3			
	E	eS			54.3		0.5			
14 Jun		eP	01	00	47.3	3	0.9		T	
		e		01	06.8		1.0			
14 Jun		eP	01	10	07.0	3	0.7		T	
		e			34.2		0.6			
14 Jun		eP	03	58	24.2	2	0.8		T	
14 Jun		eP	15	07	17.0	2	0.7		T	
14 Jun	N	eSur	16	30	20.0		2.0		R	Weak surface on LP and BB
	LPN	eSur			37					Medium surface waves on SP and IB Foreshock of following Gulf of California event. LPZ and LPE inoperative
14 Jun		eP	18	42	58.1	3	0.9	SW	T	
14 Jun		eP	18	47	25.8	3	0.8		R	Gulf of California
	E	eSur		51	15.0		2.0			26.0 N 109.8 W
	LPN	eSur			40					h about 30 km 0 = 18 44 30.2 Weak surface waves on LP Strong surface waves on BB, IB and SP. LPZ and LPE inoperative
14 Jun		eP	20	17	50.5	20	0.8	SSE	T	
14 Jun		eP'	20	51	11.8	3	0.9		T	Ethiopia
	LPN	eSur	21	31	50					10.8 N 40.1 E h about 56 km 0 = 20 32 24.0 Medium surface waves on LP LPZ and LPE inoperative

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
14 Jun		eP	23	59	59.8	8	1.0		T	Fox Islands, Aleutian Islands
15 Jun		e	00	01	31.1		0.9			
		e			56.1		1.0			52.0 N 172.2 W h about 100 km 0 = 23 50 44.0 LP, BB and IB systems inoperative
15 Jun		eP	00	58	21.9	7	1.0		T	Venezuela 6.8 N 73.0 W h about 198 km 0 = 00 51 32.0 LP, BB and IB systems inoperative
15 Jun		eP	01	19	39.6	7	1.0		T	
15 Jun		eP	03	41	24.7	1	0.5		T	
15 Jun		eP	03	42	06.8	2	0.6		T	△(S-P) = 51.5°
	E	eS		49	27.0		1.6			
15 Jun		eP	17	27	01.2	2	0.3		R	
		e			11.5		0.3			
		e			28.8		0.4			
	N	eSur		28	19.7		0.5			
15 Jun		eP	18	03	53.5		0.2		NR	△(S-P) = 1.7°
	E	eS		04	14.7		0.4			
15 Jun		eP	22	05	45.5	4	1.0		T	
15 Jun		eP	22	37	04.1	1	0.6		T	Near south coast of Kamchatka
		e			10.5		0.6			
		e			44.3		0.8			51.7 N 158.8 E h about 25 km 0 = 22 25 50.6

DATE	Syst.	Phase	Arrival Time G. C. T.			Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h.	m.	s.					
15 Jun		eP	23	36	39.5	13	0.9		T	Kurile Islands
	IB	e			50		4.5			45.4 N 151.3 E
		e		38	02.9		1.0			h about 38 km
		e			14.4		1.0			0 = 23 24 40.5
		ePP		39	32.4		2.0			Weak surface waves
	BBE	eS		46	31		8.0			on LP
	LPN	e		50	45		21.0			LPZ and LPE
	LPN	eSur		57	20					inoperative
16 Jun		eP	01	07	36.1	3	1.0		T	
16 Jun		eP	06	41	14.5	9	1.2		T	Andreanof Islands, Aleutian Islands
										51.4 N 173.2 W
										h about 25 km
										0 = 06 31 43.4
16 Jun		eP	07	06	24.7	1	0.3		R	
		e			52.1		0.4			
	N	e(Sur)		07	45.1		0.4			
	N	eSur		08	27.1		0.6			
16 Jun		eP	07	20	18.5	118	1.4		T	Off coast of southern Chile
		e			34.6		1.6			41.2 S 74.5 W
	N	eS		30	16.1		4.0			h about 17 km
	LPN	eSS		35	15		22.0			0 = 07 08 16.5
	LPN	e(Sur)		41	10					LPZ and LPE inoperative
16 Jun		eP	07	57	26.1	2	0.7		T	
16 Jun		iP	10	38	37.5	d 999			T	Northern Columbia
	BB	e		39	09		7.0			8.8 N 73.4 W
	BB	e(PP)			51		9.0			h about 120 km
	LPN	eS		43	48		22.0			0 = 10 31 56.2
		eScP		44	45.1	999				Mag. 6 (Pas)
		e			40.8		2.2			LPZ and E inoperative
	LPN	e(SS)		46	30		18.0			
	LPN	e(Sur)		47	35					
		e		53	33.9		1.2			
		ePKKP	11	03	23.1		1.0			
		e(P'P')		11	02.1		1.2			Possibly new event

DATE	Syst.	Phase	Arrival Time G. C. T.			Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h.	m.	s.					
16 Jun		eP	11	17	12.5	1	0.7		T	
16 Jun		eP	15	56	22.8	3	0.6		T	Southern Bolivia
		epP			51.6		1.0			21.8 S 67.6 W
										h about 112 km
										0 = 15 46 00.1
16 Jun		eP	21	15	47.6	1	0.8		T	
17 Jun		eP	01	23	11.5	1	0.7		T	
17 Jun		eP	02	06	57.2	1	1.0		T	
17 Jun		eP'	08	24	27.3	1	0.9		T	Southern Iran
		ePKKP		35	22.9		0.6			28.7 N 55.3 E
	LPN	eSur		59	00					h about 25 km
										0 = 08 05 54.5
										Weak surface waves on LP
										LPZ inoperative
17 Jun		eP	11	05	35.6	16	1.2		T	Peru
		e		06	09.8		0.9			11.9 S 75.3 W
		e			34.1		1.0			h about 29 km
		ePcP			51.6		0.5			0 = 10 56 30.3
		e		09	34.4		1.3			Mag. 5 (Pal)
	LPN	eS		13	00		24.0			Strong surface waves on LP
	BBE	eScS		15	28		6.0			LPZ inoperative
	LPN	eSur		17	30					
17 Jun		eP	12	53	49.1	3	1.0		T	
		e		54	19.8		1.0			
17 Jun		iP	15	12	13.1	c 999			T	Mexico - Guatemala border
	LPE	e		13	50		37.0			14.2 N 92.2 W
		eSur		16	00.0	999				h about 147 km
	LPN	eSur			10					0 = 15 07 36.1
										Mag. 6 (Pas)
										Very strong surface waves on all systems
										LPZ inoperative at 1518 Z

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
17 Jun		eP'	15	42	57.6	3	0.7		T	Central New Guinea
		e		43	24.2		0.8			3.7 S 138.2 E
		e			34.5		1.2			h about 139 km
		ePP		44	16.2		1.8			0 = 15 24 17.8
		ePKKP		53	12.8		0.6			
17 Jun		eP	15	55	55.7	1	0.8		T	Possible phases of
		e		56	13.3		0.7			previous event
17 Jun		eP	16	54	19.5	3	0.7		T	
17 Jun		eP	16	59	09.8	2	0.8		R	
	E	eSur	17	02	55.3		1.1			
17 Jun		eP	17	52	28.1	3	1.2		T	
		e			44.7		0.9			
17 Jun		eP	18	17	35.8	3	0.8		T	
17 Jun		eP	18	44	30.0	999			T	Near coast of Guatemala
		eSur		48	18.0	999				14.5 N 92.1 W
	LPN	eSur			30					h about 105 km
										0 = 18 39 51.4
										Strong surface waves
										on SP, LP and IB
										Medium surface waves
										on BB
										LPZ inoperative
18 Jun		eP	00	49	02.8	4	0.7		R	
		e			42.0		1.0			
	E	eSur		52	51.8		0.6			
18 Jun		eP	02	11	07.8	1	0.3		R	
	E	eSur		15	00.0		1.2			

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
18 Jun		eP'	03	30	47.9	5	0.5		T	Java Sea
		e		32	20.4		0.8			5.9 S 113.0 E
		epP		33	36.5		1.1			h about 641 km
		ePKKP		40	13.0		1.2			0 = 03 12 35.7
		e(SKKP)		42	12.8		0.7			Phase at 02 42 12.8
		e		45	08.2		1.0			possible new event
		e		46	10.0		1.2			
18 Jun		eP	04	47	34.4	2	0.5		R	
	E	eSur		49	13.8		0.6			
18 Jun		eSur	04	51	13.8		0.6		R	
18 Jun		eP	08	14	43.8	1	1.0		T	Southern Arizona
		e		15	32.2		1.2			32.2 N 112.5 W
		e		17	07.6		1.2			h about 25 km
		e		18	11.0		1.8			0 = 08 12 07.1
		eSur			52.0		3.0			Strong surface waves
	BB	e		20	29		11.5			on all systems
										LPZ inoperative
18 Jun		eP'	10	28	46.6	1	0.7		T	Iran
		e		29	12.2		0.6			29.0 N 55.0 E
										h about 21 km
										0 = 10 10 13.8
18 Jun		eP	10	40	49.0	3	0.7		T	
		e		46	07.0		0.9			
18 Jun		eP'	11	10	42.3	1	0.6		T	Iran
										28.3 N 54.6 E
										h about 25 km
										0 = 10 52 07.5
18 Jun		eP'	13	40	54.3	1	0.5		T	Celebes
										0.2 N 123.9 E
										h about 91 km
										0 = 13 21 55.9

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
18 Jun		eP	14	08	22.4	6	1.0		T	Kermadec Islands region
		e			36.6		0.5			31.3 S 179.8 E
		epP		09	59.2		1.1			h about 434 km
		e		11	32.8		1.4			0 = 13 55 16.6
		e		12	10.0		1.4			
		ePP			35.7		1.8			
		e		13	39.5		1.6			
	E	eSKS		18	20.2		1.6			
	N	e			58.1		0.9			
	N	e		19	01.9		1.4			
		e			12.0		1.0			
	LPE	eS			33		15.0			
	LPN	ePS		21	27		14.0			
	LPE	e(PPS)		22	27		15.0			
		ePKKP		24	32.5		0.6			
	LPE	eSS		26	48		14.0			
		e(SKKP)		27	18.8		0.8			
	LPE	e(Sur)		37	00					
18 Jun		eP	14	24	56.2	4	0.9		T	Aftershock of previous event
		ePP		29	08.1		1.6			
	E	eSKS		34	57.0		2.0			
18 Jun		eP	14	27	32.0	2	0.9		T	
	E	e		36	31.8		1.7			
18 Jun		eP	14	50	41.1	1	0.6		T	
18 Jun	e	eP	16	59	37.0	3	0.8		T	Tonga Islands
										21.2 S 176.1 W
										h about 360 km
										0 = 16 47 03.9
18 Jun		eP	17	45	07.4	3	1.1		T	Off coast of Central Chile
					54.1		1.1			38.9 S 74.8 W
										h about 44 km
										0 = 17 33 19.1

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
18 Jun		eP	17	49	08.5	1	0.4		R	
	E	eSur		50	50.1		0.5			
18 Jun		eP	19	36	22.7	1	0.6		T	
18 Jun		eP	19	38	49.3	1	0.7		T	
19 Jun		eP	00	39	57.7	2	1.0		T	
19 Jun		eP	01	01	51.4	5	1.0		T	
19 Jun		eP	01	38	48.5	19	0.8	SE	R	
		e		39	48.0		0.9			
	E	eSur		42	33.0		0.9			
19 Jun		eP	02	03	05.2	1	0.6		T	
19 Jun		eP[1]	02	04	10.8	3	1.0		T	Luzon, Philippine Islands
		ePP		05	29.1		1.8			12.6 N 121.9 E
		ePKKP		14	23.9		1.0			h about 120 km
	LP	eSP		15	32		13.0			0 = 01 45 29.9
	LPN	eSS		22	00		25.0			Medium surface on LP
	LPN	eSur		37	00					
	LP	eSur		45	00					
19 Jun		eP	02	58	41.4	4	1.2		T	Off east coast of Honshu, Japan
		e		59	01.5		1.0			39.3 N 142.9E
										h about 85 km
										0 = 02 46 03.6
19 Jun		eP	07	00	12.4	12	0.8	SE	T	
		e			23.2		0.7			

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
19 Jun		eP	07	51	08.4	7	1.1		T	Off east coast of Honshu,
		e			33.0		0.6			Japan
		e		52	43.5		1.4			39.2 N 142.9 E
		e		53	17.0		1.2			h about 98 km
	LPN	eS	08	01	45		24.0			0 = 07 38 29.6
	LPN	eSS		07	10		18.0			Medium surface waves
	LPN	eSur		14	40					on LP
	LP	eSur		24	35					
19 Jun		eP	08	12	21.8	3	1.0		T	Near east coast of Honshu,
		e			39.2		1.1			Japan
		e		13	12.0		1.5			39.7 N 142.6 E
										h about 23 km
										0 = 07 59 38.1
19 Jun		eP	09	33	13.0	1	0.2		NR	△(S-P) = 4.3°
		e			18.0	999				
		eS		34	02.7	999				
19 Jun		iP	17	09	51.9	c 999			L	△(S-P) less than .1°
		eS			54.3	999				
19 Jun		eP	17	18	39.2	2	0.8		T	Hindu Kush
		ePP		22	54.1		1.5			36.6 N 71.0 E
		e		24	10.8		1.2			h about 151 km
		ePKS		26	10.2		1.4			0 = 17 04 30.3
	BB	eSP		32	15		7.0			LP system inoperative
		ePKKP		33	51.1		0.7			SPE inoperative
		e		34	43.8		0.6			Possibly 2 events
		e			55.2		1.2			intermingled.
		e		35	27.8		1.5			
19 Jun		eP	18	08	22.8	2	0.3		NR	△(S-P) = 1.7°
	N	eS			43.9		0.4			SPE inoperative
19 Jun		eP	20	59	11.3	2	0.5		R	
		e			23.1		0.5			
		e			41.1		0.4			
	N	eSur	21	02	27.3		0.6			

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
19 Jun		eP	21	42	50.7	2	0.8		T	
19 Jun		eP	21	57	47.7	1	0.7		T	
19 Jun		eP	22	28	17.3	5	0.6		T	Kamchatka
		e			25.6		1.0			53.7 N 160.7 E
	LPE	eS		37	21		17.0			h about 25km
	LPE	e		42	10		25.0			0 = 22 17 13.5
	LPN	e		45	25		24.0			Medium surface on LP
	LPE	eSur		47	58					
	LP	eSur		50	30					
20 Jun		eP	02	39	47.8	1	1.0		T	
20 Jun		eP	03	30	51.6	1	0.8		T	
		e		31	04.5		0.8			
20 Jun		eP'	03	40	26.2	1	0.7		T	Gulf of Aden
		e			32.1		0.8			11.5 N 44.5 E
		ePP		41	58.3		1.5			h about 30 km
		ePKKP		50	28.5		0.8			0 = 03 21 26.5
	LPE	eSS		58	34		25.0			Medium surface waves
	LP	eSur	04	16	13					on LP
20 Jun		eP	04	33	52.4	11	1.4		T	Off coast of southern Chile
		e		34	33.0		1.0			38.3 S 74.1 W
										h about 25 km
										0 = 04 22 02.1
20 Jun		eP	05	18	44.6	1	0.6		T	
20 Jun		eP	07	55	41.1	2	0.9		T	
20 Jun		eP	08	35	01.2	2	0.9		T	
20 Jun		eP	09	53	50.5	50	1.0	SSE	T	△(S-P) = 23°
	E	eSur		57	42.0		1.1			
	LPN	eS			55		19.0			

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
20 Jun		eP	11	36	10.8	4	1.0	SSE	T	
		e		39	30.3		0.9			
20 Jun	LP	eSur	15	16	14				T	Loyalty Islands 21.8 S 169.3 E h about 64 km 0 = 14 27 02.6 Medium surface on LP
20 Jun		eP	16	57	46.7	3	0.3		NR	$\triangle$(S-P) = 4.6°
	N	e		58	24.1		0.3			
		eS			40.1	999				
20 Jun		eP	21	14	56.6	3	0.9		T	
20 Jun		eP	21	26	33.0	88	1.5		T	Near north coast of Honduras
		e		29	55.6		1.0			15.8 N 87.4 W
		eSur		30	24.0		1.0			h about 137 km
	LPN	e			40		18.0			0 = 21 21 54.2
20 Jun		eP	22	55	41.9	1	0.5		NR	$\triangle$(S-P) = 3.2°
		e			47.8		0.5			
	E	eS		56	19.6		0.5			
		eSur			28.6		0.5			
21 Jun		eP	04	02	26.4	999			T	Northwestern Honduras
	E	e(Sur)		06	16.0		0.8			15.3 N 87.3 W
	LPN	eS			31		19.0			h about 114 km
	LP	eSur		08	24					0 = 03 57 44.0 Strong surface waves on LP, SP and IB Weak surface waves on BB
21 Jun		eP	04	36	29.0	1	1.0		T	
21 Jun		eP	06	19	48.6	1	0.6		T	

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
21 Jun		eP'	06	57	41.0	2	0.8		T	Iran
		ePKKP	07	08	52.8		0.6			27.9 N 55.0 E
	LPE	eSur		32	30					h about 45 km
	LP	eSur		39	10					0 = 06 39 22.8 Weak surface waves on LP
21 Jun		eP'	07	52	18.2	1	0.5		T	Eastern New Guinea
		ePP		53	13.7		1.5			7.7 S 146.7 E
		e		57	20.7		1.0			h about 25 km
	LP	eSur	08	28	56					0 = 07 33 34.4 Medium surface waves on LP Phase reported at 07 57 20.7 possibly new event
21 Jun		eP	08	55	18.6	3	1.0	NE	T	
21 Jun		eP'	09	22	10.6	1	0.6		T	Near north coast of Mindanao, P. I.
		e(PP)		23	24.4		1.1			8.4 N 124.4 E h about 615 km 0 = 09 04 19.4
21 Jun		eP	09	37	44.9	4	1.2		T	
21 Jun		eP	10	45	49.6	2	0.8		T	
21 Jun		e(P)	12	20	25.0	1	0.3		R	
		e			35.7		0.5			
	E	eSur		22	15		1.0			
21 Jun		eP	12	49	49.2	1	0.6		R	
		e		50	33.0		0.5			
		e			42.8		0.6			
		eSur		52	13.0	999				
21 Jun		eP	13	36	31.5	5	1.1		T	

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
21 Jun		eP	15	15	22.7	999	0.8	SE	T	△(S-P) = 22.5°
		e			43.0		1.0			
		e			47.0		0.8			
		e		16	13.5		0.8			
	N	eS		19	24.1		1.0			
21 Jun		eP	16	17	57.6	2	0.8		T	
21 Jun		eP	16	23	08.0	5	0.6	NNW	T	
21 Jun		eP	16	58	50.0	1	0.7		T	
21 Jun		eP	17	58	55.4	4	1.2		T	
21 Jun		eP	18	26	54.6	2	0.8		T	Tonga Islands 18.8 S 173.3 W h about 25 km 0 = 18 13 59.4
21 Jun		eP	19	14	45.6	4	1.0		T	
21 Jun		eP	19	34	55.8	3	1.0		T	
21 Jun		eP	20	04	09.7	999			NR	△(S-P) = 1.7° SPE inoperative
		e			19.4	999				
	N	eS			31.0	999				
21 Jun		eP	20	41	08.9	1	0.6		T	Near north coast of Java 7.6 S 110.0 E h about 163 km 0 = 20 25 00.9 SPE inoperative Initial arrival is P diffracted Phase reported at 20 56 00.0 possibly new event
		e			26.4		1.0			
		eP'		44	15.8	16	0.8			
		e		45	33.8		0.9			
		e(PP)		47	46.6		1.1			
	LPN	e		50	25		18.0			
		e		52	03.0		1.0			
	LPE	eSKKS		54	10		13.0			
	LPE	e		55	00		21.0			
		e		56	00.0		0.7			
		e			08.0		1.0			
	LPN	e		58	25		25.0			

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
21 Jun	LP	eSur	21	10	47				T	Medium surface waves on LP
21 Jun		eP	23	05	09.2	5	1.0	SE	T	
21 Jun		eP	23	08	53.3	9	1.0	SE	T	
21 Jun		eP	23	28	24.9	3	0.2		NR	△(S-P) = 1.7°
		eS			46.8	999				
21 Jun		eP	23	40	26.4	2	0.2		NR	△(S-P) = 1.7°
		e			35.6		0.2			
	E	eS			47.6		0.4			
22 Jun		eP	01	08	36.4	5	0.6		T	Northern Albania - Yugoslavia border 42.4 N 19.6 E h about 53 km 0 = 00 56 04.7 Medium surface waves on LP
	LPN	e(S)		19	12		9.0			
	LPE	eSur		35	15					
	LP	eSur		40	00					
22 Jun		eP	02	11	27.8	2	0.9		T	
22 Jun		eP	07	53	47.8	5	0.9		T	Near coast of northern Chile 19.2 S 70.6 W h about 162 km 0 = 07 43 54.5
		e(PcP)		54	34.4		0.6			
22 Jun		eP	09	57	25.2	2	0.7		T	
22 Jun		eP	19	45	31.5	3	1.0		T	
22 Jun		eP	20	05	12.5	23	0.6		T	Off coast of El Salvador 12.8 N 89.9 W h about 99 km 0 = 20 00 13.1 Medium surface waves on LP
	E	eS		09	26.2		2.4			
	LP	eSur		10	07					

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
22 Jun		eP	21	24	56.7	4	0.2		NR	△(S-P) = 1.8°
	E	eS		25	19.1		0.4			
22 Jun		eP	22	25	22.8	2	0.8		T	
22 Jun		eP	23	45	56.4	3	1.0		T	
23 Jun		eP	00	12	20.0	2	0.8		T	
23 Jun		eP	00	35	18.8	1	0.4		NR	△(S-P) = 1.7°
		eS			40.1		0.4			
23 Jun		eP	01	16	00.1	42	0.9	SSE	R	
		e(Sur)		19	57.2		1.3			
23 Jun		eP	03	18	40.0	1	0.6		T	
23 Jun		eP	05	58	30.4	4	0.9		T	
23 Jun		eP	06	15	35.4	3	1.1		T	
										All systems inoperative from 07 07Z to 1542 Z
23 Jun		eP'	16	54	58.7	2	0.6		T	Iran 28.5 N 55.5 E h about 54 km 0 = 16 36 28.0
23 Jun		eP	21	15	58.3	4	1.0		T	
24 Jun		eP	01	00	23.1	4	1.2		T	
24 Jun		eP	01	36	51.4	2	1.0		T	
24 Jun		eP	02	00	37.8	2	0.9		T	
24 Jun		eP	02	41	27.7	2	0.8		T	

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
24 Jun		eP	05	00	07.4	2	0.9		T	
		e			19.1		0.8			
24 Jun		eP	05	12	48.3	12	1.4		T	Near coast of El Salvador
	LPE	eSur		17	09					13.6 N 90.2 W
		e			29.1		1.1			h about 90 km 0 = 05 07 56.0 Mag. 4-3/4 - 5 (Pal) Strong surface waves on BB and LP BBN inoperative
24 Jun		eP	07	13	53.1	2	1.2		T	
24 Jun		eP'	09	55	21.3	1	1.0		T	Sumatra
		e			48.0		1.2			4.1 N 97.5 E
		e		58	52.4		1.3			h about 188 km
	LP	eSur	10	39	00					0 = 09 36 08.8 Medium surface waves on LP
24 Jun		eP	12	23	02.4	7	1.3		T	
24 Jun		eP	14	00	44.7	2	0.9		T	
24 Jun		eP	14	53	23.6	1	0.6		NR	△(S-P) = 3.9°
	E	eS		54	10.0		0.8			
24 Jun		eP	16	22	07.5	3	1.1		T	
24 Jun		eP	16	38	40.0	9	1.6		T	
24 Jun		eP	16	48	29.6	3	1.1		T	
24 Jun		eP	17	54	07.0	2	0.8		T	
24 Jun		eP'	19	53	36.5	6	1.3		T	Ceram Sea 2.9 S 130.4 E h about 19 km 0 = 19 34 32.6

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
25 Jun		eP	02	42	03.4	11	0.8		T	Near north coast of Honshu, Japan
		e			18.9		1.0			40.8 N 144.1 E
										h about 57 km
										0 = 02 29 29.9
25 Jun		eP	06	03	07.5	3	1.2		T	
25 Jun		eP	09	22	25.9	5	0.9		T	Fiji Islands
		epP		24	15.8		1.0			19.4 S 177.9 W
										h about 489 km
										0 = 09 10 04.2
25 Jun		eP	11	04	41.8	2	1.0		T	Near north coast of Columbia
		e(PP)		05	31.6		1.5			10.8 N 76.0 W
	LP	eSur		14	25					h about 76 km
										0 = 10 58 24.0
										Weak surface waves on LP
25 Jun		eP	12	31	30.7	1	0.6		T	Off northeast coast of Honshu, Japan
										40.5 N 144.6 E
										h about 24 km
										0 = 12 18 53.3
25 Jun		eP	14	29	25.9	3	1.1		T	
		e		30	40.6		1.1			
25 Jun		eP	17	00	15.2	12	1.4		T	North of Mariana Islands
		e			51.4		1.1			21.7 N 143.1 E
		ePP		04	05.1		1.7			h about 13 km
	E	eSKS		10	58.0		3.4			0 = 16 46 32.9
	E	eS		11	52.5		3.5			Mag. 5-3/4 (Berk)
		e(PKKP)		17	18.2		1.1			Strong surface waves
	LPE	eSur		28	40					on LP and BB
	LP	eSur		34	10					
25 Jun		eP	19	43	53.1	22	1.5		T	Near coast of southern Chile
		e		44	48.8		1.2			37.9 S 73.3 W
										h about 124 km
										0 = 19 32 14.4

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
25 Jun		eP	19	49	25.9	3	0.8		T	
25 Jun		eP	19	56	50.5	2	0.8		T	
26 Jun		eP	03	17	42.9	3	1.2		T	
26 Jun		eP	07	15	05.9	12	1.0		T	Strong surface waves
		e			33.7		1.0			on LP
		e		16	24.4		0.9			Weak surface waves on BB
		e		19	19.5		1.0			
		e		20	31.6		1.3			
	LP	e		30	23		19.0			
	LPE	eSur		46	05					
	LP	eSur		51	26					
26 Jun		eP	13	00	10.7	2	0.7		R	Baja California
		e			34.8		0.9			27.1 N 112.9 W
	N	eSur		03	58.0		1.6			h about 60 km
										0 = 12 56 56.6
										Strong surface waves
										on all systems
26 Jun		eP	14	02	01.3	2	1.0		T	Tonga Islands
	LP	eSur		35	34					21.0 S 174.4 W
										h about 25 km
										0 = 13 48 57.2
										Weak surface waves on LP
26 Jun		eP	14	41	41.6	1	0.6		T	
26 Jun		eP	14	57	41.4	39	1.4		T	Near Islands, Aleutian Is.
		e			53.2		1.3			52.4 N 174.5 E
		e		58	34.2		0.9			h about 60 km
		e(PP)		59	42.2		1.6			0 = 14 47 26.1
	BB	eScP	15	02	15		6.0			Mag. 5-1/2 - 5-3/4 (Pal)
	LPE	eS		06	06		17.0			Strong surface waves
	LPN	eScS		07	32		14.0			on LP and BB
	LPN	e(SS)		09	25		15.0			
	LPN	eSur		16	38					
	LP	eSur		19	59					
		eP'P'		26	56.1		1.1			

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
26 Jun		eP	16	50	02.6	6	0.9		T	Near north coast of Columbia 11.2 N 74.5 W h about 89 km 0 = 16 43 40.5
26 Jun		e	18	01	44.5		0.6		R	
		e			59.9		0.8			
	E	eSur		02	08.0		0.6			
26 Jun		eP	23	01	23.4	1	0.4		NR	△(S-P) = 1.7°
	E	eS			44.8		0.5			
27 Jun		eP	03	16	18.9	2	0.6		T	Peru - Brazil border 8.5 S 74.4 W h about 170 km 0 = 03 07 47.8
		e			39.0		0.6			
		e			50.0		0.8			
		e		17	06.4		0.7			
		e		18	14.2		0.8			
27 Jun		eP	03	30	46.6	1	0.8		T	Unimak Island region 53.6 N 163.4 W h about 93 km 0 = 03 22 09.2
27 Jun		eP	05	48	36.2	4	0.8	SE	T	
		e		49	16.4		0.8			
		e		50	02.8		0.7			
		e			32.8		1.2			
27 Jun		eP	07	18	51.8	1	0.9		T	Yunan Province China
		eP'		22	25.1	4	1.0			27.8 N 99.4 E
		e			57.5		1.2			h about 33 km
	LP	ePP		23	31		16.0			0 = 07 03 42.2
	BB	eSKP		25	58		10.0			Mag. 6 (Pas), 6-1/2 (Berk),
	LPE	eSKS		29	17		18.0			5-3/4 - 6 (Pal)
	LPE	eSKKS		30	32		17.0			Strong surface waves on
		ePKKP		32	59.9		1.0			LP and BB
	LPE	ePS		33	20		19.0			Weak surface waves on
	LPE	ePPS		34	22		26.0			SP and IB
		e(PcPPKP)		36	51.2		1.6			Initial arrival is P diffracted

(continued on next page)

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
	LPE	eSS		39	25		18.0			(continued from preceding page)
	LPE	eSKKKS		43	19		17.0			
	LPN	e		48	55		35.0			
	LP	e		53	35		25.0			
	LPE	eSur		55	40					
	LP	eSur	08	00	15					
27 Jun		iP	08	03	33.6	c 20	0.7		T	Kamchatka
		e		04	32.3		0.7			54.6 N 157.7 E
		e			56.2		0.8			h about 19 km
	E	eS		12	19.0		1.6			0 = 07 52 23.7
		e		14	41.6		1.0			
27 Jun		eP	08	31	31.2	4	1.2		T	
27 Jun		eP	09	51	53.4	3	1.1		T	
27 Jun		eP	10	31	18.3	2	0.9		T	
		e		32	18.4		0.5			
27 Jun		eP	15	33	58.7	1	0.8		T	
27 Jun		eP	16	23	04.0	1	0.2		NR	△(S-P) = 1.7°
		eS			25.2		0.5			
27 Jun		eP	19	19	25.9	999			R	
	N	eSur		22	49.3		0.9			
27 Jun		eP	20	36	48.5	3	0.7		T	
27 Jun		eP	21	25	32.1	1	0.3		NR	△(S-P) = 1.7°
		eS			53.7	999				
27 Jun		eP	22	00	55.8	2	0.2		NR	△(S-P) = 2.2°
	E	eS		01	23.0		0.3			
28 Jun		eP	01	22	30.1	13	0.6		R	
		e			44.0		0.8			
		e		26	24.7		0.8			

DATE	Syst.	Phase	Arrival Time G.C.T.	Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h. m. s.					
28 Jun		eP	02 15 17.6	3	0.8		T	Central Peru
		ePcP	16 32.6		0.6			11.4 S 74.0 W
		e	38.4		0.8			h about 25 km
								0 = 02 06 10.2
28 Jun		eP	04 51 24.5	1	0.8		T	
		e	34.3		0.7			
28 Jun		eP	11 07 03.4	1	0.9		T	
28 Jun		eP	11 12 49.0	2	0.8		T	Possible phase of previous event
28 Jun		eP	11 23 42.4	1	0.8		T	
28 Jun		eP	13 21 54.1	1	0.2		L	$\triangle$(S-P) less than .1°
		eS	58.0	999				
28 Jun		eP	13 34 55.5	40	1.0		T	Near south coast of Sumatra
		e	35 04.5		0.8			4.7 S 102.7 E
		ePP	38 12.0		1.5			h about 142 km
								0 = 13 15 31.0
28 Jun		eSur	15 53 43.2		2.0		T	
		eSur	54 51.6		2.2			
28 Jun		eP	16 10 03.1	15	0.9	NW	T	
		e	12.1		1.0			
28 Jun		eP	17 47 23.9	5	1.3		T	
		e	48 02.3		1.5			
		e	21.1		0.9			
28 Jun		eP	18 08 32.8	2	0.4		NR	$\triangle$(S-P) = 1.7°
		e	42.4		0.4			
		eS	54.6	999				
28 Jun		eP	18 09 36.7	5	0.8		T	

DATE	Syst.	Phase	Arrival Time G.C.T.	Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h. m. s.					
28 Jun		eP	18 11 15.8	1	0.4		NR	$\triangle$(S-P) = 2.3°
	E	eS	43.6		0.5			
28 Jun		eSur	19 35 11.6		1.8		T	
		eSur	36 08.2		2.0			
28 Jun		eP	20 12 24.4	9	1.1	SE	T	
29 Jun		eP	00 17 44.4	2	0.2		NR	$\triangle$(S-P) = 1.7°
		e	53.8		0.3	SE		
		eS	18 06.0	999				
29 Jun		eP	06 48 12.6	1	0.7		T	
29 Jun		eP	09 36 51.9	3	1.0		T	New Hebrides Islands
	LP	ePP	40 50		13.0			13.8 S 166.0 E
		e	41 13.2		1.0			h about 37 km
	BBE	eSKS	47 30		8.0			0 = 09 22 55.8
	LPE	e(PS)	50 15		25.0			Mag. 6-1/4 - 6-1/2 (Berk)
	LP	e(SPP)	51 15		27.0			5-1/2 - 5-3/4 (Pal)
		ePKKP$_1$	52 53.5		0.9			Strong surface waves
		ePKKP$_2$	53 03.7		0.8			on LP and BB
		e	15.3		0.8			Phase reported at
	LPE	eSS	55 40		29.0			09 57 09.2 possible
		e(PcPPKP)	57 09.2		1.1			new event
	LPE	eSKKS	59 45		30.0			
	LPE	eSur	10 05 35					
	LP	eSur	10 14					
29 Jun		eP	10 36 45.4	1	0.6		T	Fiji Island region
								22.6 S 179.1 E
								h about 654 km
								0 = 10 24 07.3
29 Jun		eP	11 46 54.4	4	1.0		T	
29 Jun		eP	13 04 28.8	1	0.6		T	

DATE	Syst.	Phase	Arrival Time G.C.T.			Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h.	m.	s.					
27 Jun		eP	14	12	06.0	11	0.6		T	Andreanof Islands,
		e			24.0		1.4			Aleutian Islands
		e		13	19.8		0.9			52.2 N 173.4 W
		e		17	38.1		1.4			h about 76 km
	LP	eSur		30	20					0 = 14 02 42.5
										Weak surface waves on LP
29 Jun		eP	17	19	40.0	3	1.0		T	
		e			52.0		0.7			
29 Jun		eP	18	00	51.2	2	0.2		NR	$\triangle$(S-P) = 1.7°
		e		01	01.0		0.3			
	E	eS			12.6	999				
29 Jun		eP	22	11	30.3	13	1.1		T	Severnaya Zemlya region
		e		12	16.9		1.1			85.0 N 97.3 E
		e			53.0		1.4			h about 11 km
	LPE	eS		19	48		26.0			0 = 22 01 21.0
	LPE	eSS		23	38		19.0			Medium surface waves
	LP	eSur		30	06					on LP and BB
29 Jun		eP	23	29	48.1	1	0.3		NR	$\triangle$(S-P) = 1.7°
	N	eS		30	09.6		0.4			
30 Jun		eP	00	18	07.4	2	0.9		T	
30 Jun		eP	04	31	02.4	4	0.7		T	Tonga Islands
		e			22.0		0.8			20.4 S 176.0 W
		epP			50.6		0.9			h about 170 km
		e		32	06.5		1.0			0 = 04 18 10.9
30 Jun		eP	05	18	39.2	1	0.8		T	
		e			50.0		0.8			

DATE	Syst.	Phase	Arrival Time G.C.T.			Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h.	m.	s.					
30 Jun		eP	06	42	19.5	4	0.7	NW	T	
		e			35.8		0.8			
		e		45	56.7		0.6			
30 Jun		eP	08	48	29.5	3	1.3		T	
30 Jun		eP	11	08	10.7	7	1.5		T	
30 Jun		eP	14	39	55.4	1	0.7		T	
30 Jun		eP	16	36	09.2	2	0.8		T	
		e		40	09.8		1.0			
30 Jun		eP	17	40	55.7	2	0.8		T	
		e		42	04.2		0.6			Possible new event
30 Jun		eP	17	50	34.8	1	0.6		T	
30 Jun		ePP	19	12	04.9		1.6		T	Banda Sea
		eSKP		13	08.8		1.0			6.7 S 129.4 E
										h about 179
										0 = 18 51 14.4
30 Jun		eP	23	13	03.2	2	0.8		T	
		e			15.0		1.0			
		e			29.9		0.7			

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July 1961

REGISTRATION OF EARTHQUAKES AT WICHITA MOUNTAINS SEISMOLOGICAL OBSERVATORY FORT SILL, OKLAHOMA, U. S. A.

Operated under the Technical Supervision of the
Air Force Technical Applications Center (AFTAC)

by

The Geotechnical Corporation
Garland, Texas

Advanced Research Projects Agency (ARPA)
Department of Defense
United States Government

THE REGISTRATION OF EARTHQUAKES

AT THE

WICHITA MOUNTAINS SEISMOLOGICAL OBSERVATORY

STATION

Station Abbreviation: WMSO
Station Identification on Film Seismograms: *a*
Geographical Location *: 34° 43' 05.3" N. Lat.
(Vault No. 6) 98° 35' 20.7" W. Long.

GEOCENTRIC LOCATION*: 34° 32' 09.8" N. Lat.
(Vault No. 6) 98° 35' 20.7" W. Long.

ALTITUDE (Meters)*: 505 Meters (1658)
(Vault No. 6)

GEOLOGY: The station is located on the Carlton (porphyritic) granophyre of the Wichita Mountains of Oklahoma.

NOISE LEVEL - July 1961: The periods of the predominant microseisms at WMSO are 0.5 second and 6 seconds. An amplitude distribution curve for the 0.5 second microseisms may be found on page 2. The short period noise spectrum is shown on page 2a.

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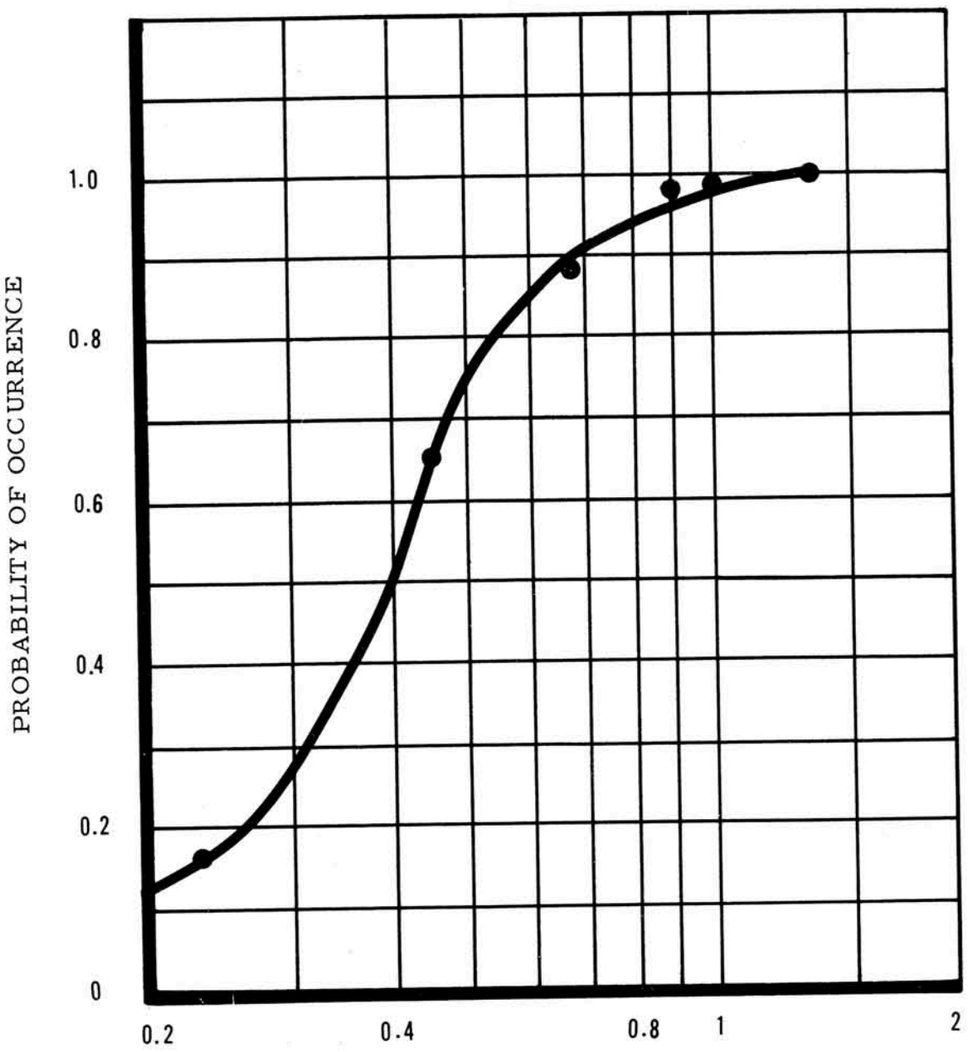
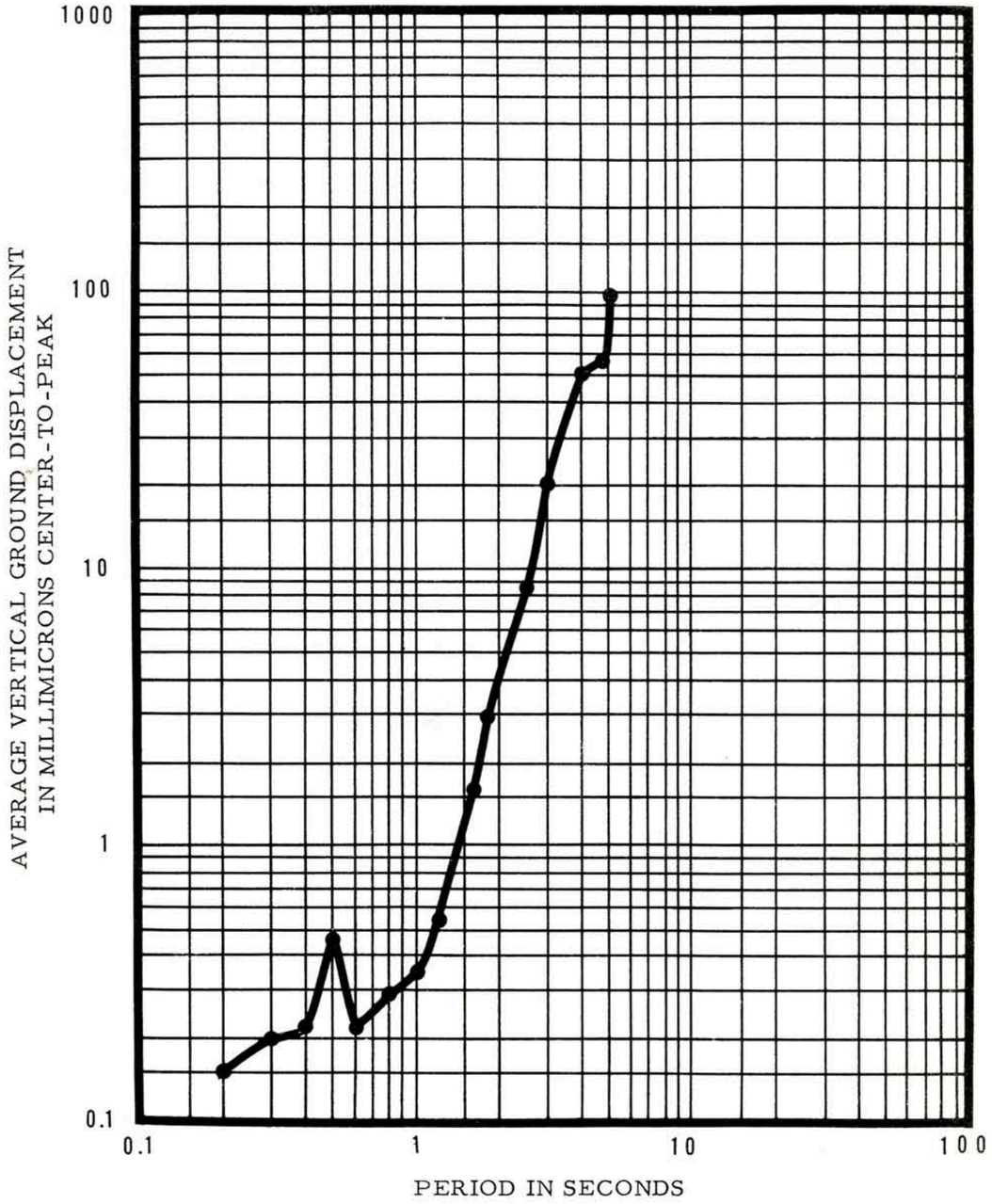
* The coordinates refer to the location of vault no. 6 which houses the 3-component groups of short-period and intermediate band seismometers from which arrival times are determined.



Probability of predominant 0.5-sec microseisms occurring at or less than a given amplitude at Unity magnification



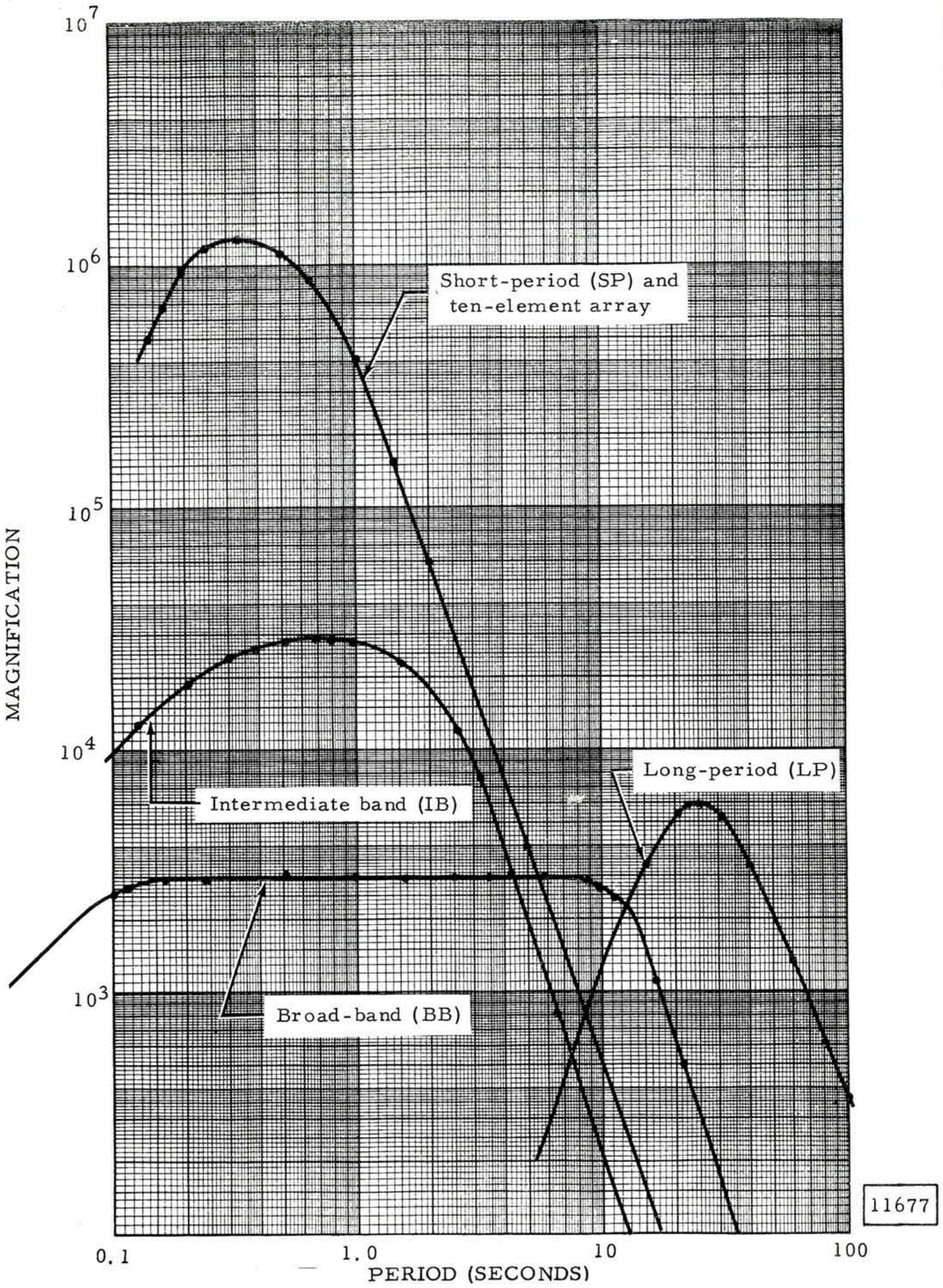
Short Period Noise Spectrum at WMSO - July 1961

SEISMOGRAPHS

	Ts	λs	Tg	λg	σ^2
SP Vertical Benioff	1.0	1.0	0.2	1.0	0.01
SP Horizontal Benioff	1.0	1.0	0.2	1.0	0.01
IB Vertical Melton	2.5	0.65	0.64	1.5	0.002
IB Horizontal Sprengnether	2.5	0.65	0.64	1.5	0.0005
BB Vertical Press-Ewing	12.5	0.4	0.64	9.0	0.0002
BB Horizontal Sprengnether	12.5	0.4	0.64	9.0	0.0004
LP Vertical Sprengnether	25.0	1.0	30	1.0	0.004
LP Horizontal Sprengnether	25.0	1.0	30	1.0	0.004

SP = Short Period
IB = Intermediate Band
BB = Broad Band
LP = Long Period
Ts = Free Period of seismometer in secs.
λs = Damping constant of seismometer
Tg = Free Period of galvanometer in secs.
λg_2 = Damping constant of galvanometer
σ^2 = Coupling Coefficient

NOTE: Response curves may be found on page 4.



Response characteristics of seismographs

INTERPRETATION OF SYMBOLS

1. Earthquakes Listed

All local (L), near-regional (NR), regional (R), and distant earthquakes (T) are tabulated on the following pages.

2. System

In the column headed "Syst." (system), the seismograph (SP, IB, BB, or LP) and component (Z, N, or E) used to measure arrival time are designated. When no component designation appears, the phase is read from the vertical component. When neither system nor component designation appears, the phase is read from the SP vertical component.

3. Phase

(1) "i" (impetus) preceding a phase designates sudden beginning of the motion. (A designation of "i" in the case of initial P motion indicates a signal-to-noise ratio exceeding about 5/1).

(2) "e" (emersio) designates gradual beginning.

(3) "i" or "e" alone designates an unidentified phase.

(4) ( ) (parenthesis marks) indicate uncertainty.

4. Time

(1) Date and arrival time are given in Greenwich Civil Time (G.C.T.)

(2) The arrival time is reported as the earliest time on Z, N, or E. Single Z rather than the array summation ($\sum$) is used for measuring arrival times on the SP seismographs.

5. Ground Motion

(1) In the columns headed "A" and "T" are tabulated earth displacement in millimicrons and period in seconds, respectively. An amplitude of 999 indicates that a signal cannot be measured reliably. A "c" or "d" in the "A" column indicates compression or dilation, respectively, of the ground as indicated by the vertical component instrument.

The value of "A" for P phases is the maximum amplitude in the first ten seconds. All amplitudes are center-to-peak amplitudes.

(2) Trace amplitudes are measured to the nearest 1/2 millimeter at X10 view.

6. Direction

In the column headed "Dir." (direction), the direction of the epicenter as viewed from WMSO is indicated. For teleseisms, direction is obtained only from P and Rayleigh waves and is listed opposite the phase from which it is obtained. For close events, direction may be obtained from P-wave step-out shown on the individual short-period vertical traces.

7. Type

Earthquakes are identified as either:

L	(local)	0^o	-	1.4^o
NR	(near-regional)	1.4^o	-	6^o
R	(regional)	6^o	-	16^o
T	(teleseismic)	16^o	-	180^o

8. Remarks Column

(1) Epicentral locations, time of origins, depth of foci, and magnitudes are obtained from the U.S. Coast and Geodetic Survey Preliminary Determination of Epicenters cards.

(2) The nature of the surface waves is indicated subjectively.

(3) Epicentral locations and distances reported by the station are accompanied by an indication of the phases used to determine epicentral distance, e.g. $\triangle$ (S-P) = 6^o, Central Colorado.

(4) Operational notes refer to operational difficulties that affect analysis of data.

DATE	Syst.	Phase	Arrival Time G.C.T.			Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h.	m.	s.					
1 July		eP	00	11	25.1	8	0.8		T	Unimak Island
		e			44.8		0.7			53.9 N 164.3 W
	LP	eSur		25	00					h about 34 km
										0 = 00 02 39.2
										Weak surface waves on LP
1 July		eP	04	27	50.8	1	0.6		T	
1 July		eP	05	38	06.0	2	0.8		T	
1 July		eP	08	13	21.5	1	0.6		T	Bonin Islands region
		e			52.6		0.9			29.8 N 140.5 E
										h about 181 km
										0 = 08 00 15.4
1 July		eP	11	02	35.8	3	0.8	NW	T	
1 July		eP	12	49	30.1	14	1.2	SE	R	
		eSur		51	15.0		1.0			
1 July		eSur	12	53	20.6		0.9		R	P hidden in previous surface group
1 July		iP	13	20	03.5	c 136	1.6		T	Near coast of Peru
		e			15.8		1.6			15.3 S 75.0 W
		e			30.2		1.5			h about 146 km
		ePcP		21	07.6		0.8			0 = 13 10 46.6
		e			20.2		1.1			Medium surface waves
	LPE	eS		27	35		20.0			on LP
	N	ePS			54.2		2.5			
	LPE	eSur		33	00					
	LPN	eSur		37	00					
	LP	eSur		39	30					
		eP'P'$_1$		50	15.4		1.0			
		eP'P'$_2$			53.0		1.1			
1 July		eP	13	57	23.1	2	0.8		T	
		e			35.6		0.9			

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
1 July		eP	19	03	08.0	4	0.9		T	Fiji Islands
		e			14.0		0.7			17.9 S 178.4 W
		ePKKP		20	22.3		0.6			h about 601 km
										0 = 18 50 57.5
1 July		iP	23	54	40.7	d 25	0.7		T	Near Islands region,
		e		55	04.0		0.7			Aleutian Islands
2 July	N	eS	00	03	12.0		3.0			53.7 N 169.8 E
	LP	eSur		15	00					h about 19 km
										0 = 23 44 05.7
										Weak surface waves on LP
2 July		eP	01	30	10.6	4	1.0		T	
2 July		eP	02	19	35.1	4	0.9		T	Hokkaido, Japan
										42.8 N 143.1 E
										h about 151 km
										0 = 02 07 14.4
2 July		eP	03	22	56.0	1	0.7		T	
2 July		eP	03	51	48.8	3	0.6		R	
	E	eSur		55	30.0		0.7			
2 July		eP	05	42	41.0	1	0.2		NR	$\triangle$(S-P) = 1.9°
		e			43.4		0.3			
		e			44.2		0.3			
	E	eS		43	05.1	999				
2 July		eP	06	09	58.5	5	1.2		T	
2 July		eP	11	56	28.8	2	0.8		T	Tonga Islands
		e		57	01.6		0.7			19.2 S 174.8 W
										h about 114 km
										0 = 11 43 36.6
2 July		eP	14	12	29.2	3	1.1		T	

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
2 July		eP	17	05	03.7	1	0.7		R	
	E	eSur		06	47.6		0.8			
2 July	LPN	eSKS	17	12	00		14.0		T	New Hebrides Islands
	LP	eSS		20	00		20.0			13.9 S 166.1 E
	LP	eSur		36	40					h about 33 km
										0 = 16 47 22.7
										Medium surface waves on LP
										Possible earlier start on surface waves, but LP calibration interfered
2 July		eP	18	11	12.2	3	0.8		T	Near Islands region,
										Aleutian Islands
										50.2 N 171.4 E
										h about 52 km
										0 = 18 00 36.2
2 July		eP	21	36	44.4	11	1.4		T	
		e			48.5		1.0			
2 July		eP	21	40	46.5	1	0.5		R	Surface group lost in
		e		41	11.5		1.1			following regional
2 July		eP	21	41	23.2	19	0.9	WNW	R	
	N	eSur		43	05.6		1.1			
2 July		eP	21	53	30.2	5	0.2	NNW	L	$\triangle$(S-P) less than 0.1°
		e			31.3		0.2			
		eS			34.0	999				
3 July		eP	07	08	00.9	1	0.4		R	Central New Mexico
		e			18.3		0.6			33.4 N 106.9 W
		eSur		09	45.0		0.8			h about 15 km
	LP	e		10	28		9.0			0 = 07 06 16.5
	BB	e			41		5.0			Strong surface waves on SP and IB

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
3 July		eP	08	33	56.6	6	0.7		T	Near west coast of Ecuador
		e		34	01.7		0.7			3.3 S 80.5 W
		e		35	55.7		0.6			h about 25 km
		e		36	01.0		0.8			0 = 08 26 10.7
	LP	eSur		47	00					Weak surface waves on LP
3 July		eP	12	20	01.8	5	0.8		T	Off coast of Mexico
		e			12.0		1.4			15.2 N 104.6 W
	LPE	e		24	45		30.0			h about 25 km
										0 = 12 15 27.3
3 July		eP	14	57	57.3	19	1.0		T	Near coast of Peru
		e		58	13.0		1.3			8.6 S 79.2 W
		ePcP		59	29.3		0.7			h about 86 km
		eScP	15	03	15.5		0.8			0 = 14 49 30.8
	LPN	eS		04	45		13.0			Weak surface waves on LP
	LP	e		09	35		30.0			
	LP	eSur		13	00					
3 July		eP	17	21	39.2	2	0.8		T	
3 July		eP	20	57	37.0	1	0.5		T	
3 July		eP	21	30	46.1	3	0.3		NR	$\triangle$(S-P) = 1.8°
		e			49.6		0.3			
	N	eS		31	08.2		0.4			
3 July		eP	22	15	59.7	3	0.6	NW	R	
	N	eSur		17	43.0		0.7			
3 July		eP	23	08	08.2	1	0.2		NR	$\triangle$(S-P) = 2.7°
	E	eS			41.0		0.5			
3 July		eP	23	43	22.3	1	0.2		L	$\triangle$(S-P) less than 0.1°
		e			23.1		0.2			
	E	eS			26.0		0.6			

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
4 July		eP	04	59	56.4	63	1.0		T	Western Nevada
	BB	e	05	03	08		7.5			40.8 N 118.0 W
	BB	e		04	32		5.0			h about 61 km
	N	eSur			41.0		3.1			0 = 04 56 03.7
	LP	e		05	10		16.0			Mag. 5-3/4 (Berk)
	LPN	e		06	18		15.0			Strong surface waves on SP and IB
4 July		eP	05	18	03.8	2	0.9		T	
4 July		eP	05	39	03.8	8	1.1		T	Possible P'P' of western Nevada event
4 July		eP	06	24	13.6	3	1.0		T	Mariana Islands
		e			26.5		0.9			17.9 N 146.4 E
		e			33.0		1.2			h about 145 km
		e(PP)		28	04.0		1.6			0 = 06 10 44.8
		e		30	17.2		1.0			Strong surface waves
		e		31	15.2		1.8			on LP
	LPN	e(SKS)		34	50		18.0			
	LPN	ePS		37	05		22.0			
		ePKKP		40	40.6		0.9			
		e		41	06.6		1.0			
	LP	eSur		55	30					
4 July		eP	06	32	58.7	3	1.0		T	
		e		33	19.5		1.0			
4 July		eP	08	29	51.8	1	0.5		T	
		e		30	22.0		0.7			
4 July	LP	eSur	09	20	00				T	Weak surface waves on LP
4 July		eP	11	13	02.7	38	1.0		T	Western Nevada
		e			06.5		1.0			40.8 N 117.8 W
		e			17.7		0.9			h about 43 km
		e		15	23.8		1.3			0 = 11 09 10.6
	N	eSur		17	49.0		1.4			Mag. 5-3/4 (Berk)
	LP	e		18	00		19.0			Medium surface waves
	LPN	e		19	25		14.0			on SP and IB

DATE	Syst.	Phase	Arrival Time G.C.T.			Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h.	m.	s.					
4 July		eP	14	26	42.0	2	0.8		T	
4 July		eP	14	44	09.8	2	0.8		T	
4 July		eP'	19	37	01.6	9	1.5		T	Macquarie Island region
	LPE	eSur	20	12	10					55.8 S 147.4 E
	LP	eSur		19	10					h about 39 km
										0 = 19 17 46.7
										Medium surface waves
										on LP
4 July		eP'	20	17	38.6	3	1.1		T	Macquarie Island region
										55.4 S 147.8 E
										h about 122 km
										0 = 19 58 34.4
4 July		eP	21	00	13.5	2	0.7		T	
4 July		eP	21	35	11.7	6	1.0	NW	T	
		e			28.0		0.9			
5 July		eP	00	12	06.8	2	1.0		T	
5 July		eP	02	30	47.4	1	0.4		R	
		e		32	21.0		0.6			
		e		33	08.0		0.6			
	E	eSur			41.0		1.0			
5 July		eP	02	37	06.0	2	0.4		R	Strong surface waves
		e			22.5		0.4			on SP and IB
		e			33.5	999				
		eSur		39	15.4	999				
5 July		eP'	02	47	52.2	3	1.0		T	Southwest of Macquarie
		e		48	01.9		1.0			Island
		e			33.4		1.8			58.2 S 150.4 E
	LPE	eSKKKS	03	07	45		23.0			h about 25 km
	LPE	e		12	25		23.0			0 = 02 28 38.2
	LPE	eSur		22	45					Medium surface waves
	LP	eSur		30	00					on LP

DATE	Syst.	Phase	Arrival Time G.C.T.			Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h.	m.	s.					
5 July		eP	04	00	38.4	2	0.9		T	
5 July		eP	05	09	52.0	3	0.7		T	Windward Islands
		e		10	14.9		0.9			15.1 N 60.4 W
		e		15	56.8		1.0			h about 91 km
	LP	eSur		20	50					0 = 05 02 28.9
										Weak surface waves
										on LP
5 July		eP	06	17	42.0	2	1.0		T	
5 July		eP	09	48	35.2	1	0.4		R	
	N	eSur		49	56.2		0.7			
5 July		eP	11	53	29.4	5	1.3		T	
5 July		eP	17	02	27.4	2	1.0		T	
5 July		eP	17	17	36.0	6	0.5		R	
	N	e			48.4		0.5			
	E	eSur		20	06.0		0.6			
5 July		eP	18	01	06.6	2	0.2		NR	$\triangle$(S-P) = 1.8°
	E	eS			28.7		0.4			
5 July	E	eS	18	02	05.5	999			NR	P lost in code of previous S.
5 July		eP	18	05	46.9	1	0.3		NR	$\triangle$(S-P) = 1.7°
	N	eS		06	08.0		0.4			
5 July		eP	21	34	54.4	1	0.5		R	
		e		35	05.5		0.6			
	E	eSur		36	21.5		0.9			
5 July		eP	22	49	38.7	1	0.4		NR	$\triangle$(S-P) = 2.2°
	E	eS		50	05.7		0.5			

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
6 July		eP	00	01	17.1	1	0.8		T	Weak surface waves on LP
	LP	eSur		19	00			SW		
6 July		eP	01	21	26.0	2	0.7		T	△(S-P) = 37°
	E	eS		27	12.0		2.8			
	BB	e		28	37		8.0			
6 July		eP	02	24	32.8	1	0.7		R	
		e			52.9		0.7			
		e		25	07.4		0.6			
	E	eSur		28	08.9		0.8			
6 July		eP	03	46	22.0	5	1.0		T	Central Nevada 40.6 N 117.5 W h about 25 km 0 = 03 42 29.9
6 July		eP	05	17	23.1	34	1.4	SE	T	△(S-P) = 23°
	E	eSur		21	20.1		1.8			Weak surface waves
	LPN	eS			28		20.0			on LP, SP, and IB.
	LP	eSur		25	05					
6 July		eP	05	49	12.0	1	0.2		L	△(S-P) = 0.3°
	E	eS			19.0		0.3			
6 July		eP	05	50	44.2	1	0.7		T	
		e			58.7		0.8			
6 July		eP	13	38	54.8	1	0.4		R	
	E	eSur		40	38.8		0.7			
6 July		eP	13	44	48.1	3	1.0		T	
6 July		eP	16	21	21.6	53	1.3		T	Ascension Island region
	LPE	eSKS		31	50		13.0			7.0 S 13.1 W
	LPE	ePS		33	20		18.0			h about 19 km
	LPE	eSS		38	00		21.0			0 = 16 08 20.8
	LPE	eSur		48	20					Medium surface waves
	LP	eSur		49	43					on LP
										Weak surface waves on BB

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
6 July		eP	16	43	28.4	2	0.2		NR	△(S-P) = 1.7°
		e			37.8		0.2			
	E	eS			49.8		0.4			
6 July		eP	18	55	33.3	3	0.9		T	
6 July		eP	20	17	21.0	1	0.8		T	
6 July		eP	22	23	26.6	29	1.4		T	New Hebrides Islands
		e		26	17.5		1.0			20.0 S 169.0 E
	LPN	ePP		27	37		26.0			h about 47 km
	LPN	eSKS		34	00		22.0			0 = 22 09 31.4
	LPN	ePS		36	50		22.0			Mag. 6-1/2 (Pas),
		$ePKKP_1$		39	24.7		0.8			6-1/2 - 6-3/4 (Pal).
		$ePKKP_2$			44.6		0.9			Strong surface waves
		e		40	04.5		1.2			on all systems
	LPN	eSS		42	35		38.0			LPZ gain low.
		e(PcPP')		43	37.5		3.0			
	LPN	eSSS		46	00		40.0			
		e(PPP)		47	25.0		3.0			
	LPN	e		49	50		30.0			
	LPE	eSur		52	50					
	LP	eSur		59	10					
6 July		eP	23	15	40.7	2	1.0		T	
7 July		eP	00	58	01.0	2	0.7		T	
7 July		eP	02	10	19.2	2	0.8		T	Kenai Peninsula, Alaska
		ePcP		12	17.7		0.6			60.8 N 148.9 W
										h about 61 km
										0 = 02 02 36.3
7 July		eP	04	02	16.6	2	1.0		R	
		eSur		05	43.8		1.2			
7 July		eP	06	36	16.8	1	0.7		T	

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
7 July		eP	06	50	28.8	1	0.8		T	
7 July		eP	08	16	45.8	1	0.6		T	Kurile Islands
		e			55.7		0.6			46.7 N 153.0 E
	LPE	eSur		33	00					h about 106 km
										0 = 08 05 03.5
										Weak surface on LP
										LPZ inoperative
7 July		eP	11	45	28.1	2	0.8		T	
7 July		eP	12	20	04.3	3	0.6	SE	T	LPZ inoperative
	LPE	eSur		32	00					
7 July		eP'	12	43	11.7	2	1.0		T	Weak surface waves on LP
		e(SKP)		46	38.3		1.0			LPZ inoperative
	LPN	e(SS)	13	01	00		22.0			
	LPE	eSur		23	00					
7 July		eP	12	49	56.9	2	1.0		T	
7 July		eP	13	25	48.3	6	1.4		T	New Britain
		eP'		29	16.3	2	0.6			5.7 S 149.7 E
	LPE	ePP			58		25.0			h about 57 km
	LPE	eSKS		36	00		25.0			0 = 13 10 43.8
	LPE	e		37	19		19.0			Mag. 6 - 6-1/4 (Pas)
	LPE	e		38	00		28.0			P diffracted at 13 25 48.3
	LPE	ePS		39	25		32.0			Strong surface waves on
		$ePKKP_1$		40	09.5		1.0			LP and BB.
		$ePKKP_2$			17.8		1.0			Weak surface waves
		$ePKKP_3$			26.0		1.0			on SP and IB
	LPE	ePPS		41	00		33.0			LPZ inoperative
	LPE	eSS		45	30		26.0			
	LPE	ePPP		48	00.		24.0			
		eP'P'			54.2		1.6			
	LPE	e		49	45		35.0			
	LPE	e		53	40		25.0			
	LPE	e		54	40		25.0			
	LPE	eSur		56	40					
	LPE	eSur	14	02	30					
		eSur		04	00					

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
7 July		iP	15	39	21.8	c 13	0.6		T	Near East coast of Kamchatka
										53.5 N 159.9 E
										h about 20 km
										0 = 15 28 14.5.
7 July		eP	15	51	39.9	3	1.2		T	
		e		52	09.5		1.3			
7 July		eP	16	05	44.6	5	1.0		T	
7 July		eP	19	04	20.0	1	0.6		T	
7 July		eP	19	34	19.3	2	0.4	SW	R	
		e		35	05.4		0.4			
	E	eSur			35.0		0.6			
7 July		eP	20	06	17.2	1	0.6		T	
7 July		eP	22	17	23.2	2	0.4		NR	$\triangle$(S-P) = 1.9°
	N	eS			47.0		0.5			
7 July		eP	22	33	29.0	1	0.8		T	Loyalty Islands region
		e		38	24.3		1.2			20.1 S 169.2 E
	LP	ePS		46	55		25.0			h about 89 km
	LP	eSPP		48	00		25.0			0 = 22 19 34.2
		$ePKKP_1$		49	25.0		1.0			Mag. 5 - 5-1/4 (Pal)
		$ePKKP_2$			35.7		0.9			Medium surface waves
		$ePKKP_3$			55.8		1.0			on LP
	LP	e		50	40		25.0			Weak surface waves on BB
	LP	eSS		51	40		28.0			
	LP	e(SKKP)		52	55		25.0			
	LP	e		55	22		25.0			
	LP	e		57	30		21.0			
	LP	eSur	23	02	37					
	LP	eSur		07	20					

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
7 July		eP	23	00	50.0	13	1.2		T	
		e		01	01.0		0.9			
		e			04.0		0.8	NW		
7 July		eP	23	26	48.2	2	0.2		NR	△(S-P) = 1.7°
	E	eS		27	09.7	999				
8 July		eP	01	54	20.4	1	0.6		R	
		e			40.4		0.9			
		e			54.3		0.6			
	E	eSur		57	59.0		0.6			
8 July		eP	01	59	29.4	2	0.9		T	
8 July		eP	02	05	39.2	1	0.8		T	
		e			59.5		1.4			
8 July		eP	02	49	19.1	3	1.0		T	Loyalty Islands
	LP	ePP		53	30		20.0			20.0 S 168.8 E
	LPN	eSKS	03	00	00		24.0			h about 52 km
	LPN	ePS		02	45		22.0			0 = 02 35 20.1
	LPN	ePPS		03	40		24.0			Strong surface waves
		ePKKP		05	16.0		1.0			on LP and BB
	LPN	eSS		08	20		30.0			Weak surface waves
	LPN	e(SSS)		12	20		34.0			on SP and IB
	LPN	e		15	35		25.0			
	LP	e(SKKKS)		16	40		40.0			
	LP	eSur		18	47					
	LP	eSur		23	45					
		eSur		36	00					
8 July		eP	05	57	26.7	3	0.9		T	Peru
		ePcP		59	03.8		0.6			6.2 S 77.1 W
		e			47.3		1.1			h about 15 km
										0 = 05 49 03.0
8 July		eP	08	03	02.0	3	1.0		T	

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
8 July		eP	08	06	22.2	2	0.9		T	
		e			33.2		1.1			
		e		07	04.5		1.0			
8 July		eP	08	24	55.4	1	0.8		T	Weak surface waves on LP
8 July	LP	eSur	08	27	00				T	
8 July		eP	10	35	04.4	1	0.6		T	
8 July		eP	12	58	29.5	3	1.0		T	
8 July		eP	14	17	31.3	2	1.0		T	
8 July	LPN	ePS	15	36	00		21.0		T	Foreshock of following
	LPN	ePPS		37	00		23.0			Loyalty Islands event
	LPN	eSS		42	00		30.0			
8 July		eP	15	48	34.3	4	1.2		T	Loyalty Islands
	LP	e		51	35		20.0			20.1 S 169.8 E
		e			47.1		1.4			h about 44 km
	LP	ePP		52	45		24.0			0 = 15 34 38.5
		e		57	30.3		2.0			Strong surface waves
	LPN	eSKS		59	18		23.0			on LP
	LP	e	16	01	20		22.0			Medium on BB
	LPN	ePS		02	00		22.0			Weak on SP and IB
	LPN	ePPS			55		25.0			
		ePKKP		04	33.1		1.2			
	LPN	eSS		07	40		35.0			
	LPN	eSKKS		11	50		32.0			
	LP	eSur		18	00					
	LP	eSur		23	00					
8 July		eP	20	43	48.5	1	0.7		T	

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
8 July		eP	21	28	12.0	2	0.9		T	Loyalty Islands
	LPE	eSKS		38	40		19.0			20.2 S 169.0 E
	LP	eSP		41	28		25.0			h about 56 km
	LPE	ePPS		42	15		24.0			0 = 21 13 59.4
	LP	eSS		46	55		30.0			Medium surface on LP and BB
	LP	eSur	22	03	00					
8 July		eP	22	02	42.0	1	1.0		T	Loyalty Islands
		e		07	07.5		1.2			20.2 S 169.0 E
										h about 68 km
										0 = 21 48 46.2
										Surface waves from previous event obscure possible phases
8 July		eP	22	12	13.0	1	0.7		T	
		e(PP)		15	32.5		1.1			
		e(SKP)		18	55.5		1.0			
8 July		eP	22	24	31.0	1	0.3		NR	△(S-P) = 1.7°
		eS			53.0	999				
8 July		eP	22	26	08.8	3	1.1		T	Tonga Islands region
										20.4 S 174.4 W
										h about 25 km
										0 = 22 13 06.6
										Surface waves from Loyalty Islands events obscure possible phases.
8 July		eP	22	50	26.6	1	0.3		R	
		e			53.5		0.5			
		eSur		52	36.5	999				
9 July		eP	04	11	49.2	2	0.8		T	
9 July		eP	05	02	14.5	33	1.2		T	British Honduras
		e			29.6		0.7			17.0 N 88.5 W
		eSur		06	08.2		1.3			h about 150 km
	LPN	e			19		20.0			0 = 04 57 52.7

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
9 July		eP	06	37	34.6	27	1.4		T	Honduras
	E	eSur		41	29.5		1.5			15.0 N 87.2 W
	LPN	e			40		19.0			h about 165 km
	LP	eSur		43	30					0 = 06 32 52.4
										Strong surface waves on LP
9 July		eP	06	48	32.4	4	1.1		T	
9 July		eP	07	33	30.3	2	0.8		T	Aftershock of Honduras events
		e			53.9		0.8			
		eSur		37	20.0		0.9			
9 July		eP	07	43	50.4	2	1.0		T	
9 July		eP	08	18	08.8	2	1.0		T	
		e			21.5		0.8			
9 July		eP	08	19	30.4	24	1.4	SE	T	Aftershock of Honduras events
		e			43.6		0.9			
	E	eSur		23	20.0		1.0			
	LPN	e			35		19.0			
9 July		eP	09	35	46.2	3	1.1		T	
9 July		eP	10	51	53.5	7	1.3		T	
		e		52	06.9		0.8			
9 July		eP	13	54	01.7	9	1.4	SE	T	Aftershock of Honduras events
		e			14.4		0.6			
	LPN	e		58	00		18.0			
9 July		eP	13	55	51.6	14	1.4	SE	T	Aftershock of Honduras events
	E	eSur		59	42.7		1.5			
	LPN	e			55		19.0			Weak surface waves on LP
	LP	eSur	14	02	35					
9 July		eP	13	58	16.0	27	1.4	SE	T	Aftershock of Honduras events
	E	eSur	14	02	07.0		1.4			

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
9 July		eP	14	17	56.6	18	1.4	SE	T	Aftershock of Honduras events
	E	eSur		21	47.7		1.4			
	LPN	e		22	05		19.0			Weak surface waves on LP
	LP	eSur		24	00					
9 July		eP	14	19	31.7	15	1.4	SE	T	Aftershock of Honduras Events
9 July		eP	14	40	26.9	1	0.7		R	
	E	eSur		41	55.0		1.0			
9 July	E	eSur	15	37	51.4		1.0		R	Possible weak aftershock of Honduras events
		e		38	32.8		1.1			
9 July		eP	15	46	58.2	3	0.4	NE	NR	$\triangle$(S-P) = 1.9°
		eS		47	21.4	999				
9 July		eP	16	51	13.8	15	1.4	SE	T	Aftershock of Honduras events
		e			27.5		1.3			
		e		52	33.5		1.3			
		eSur		55	09.0		1.5			
9 July		eP	16	56	14.6	2	0.7		T	Rat Islands, Aleutian Islands 51.7 N 176.2 E h about 33 km 0 = 16 46 02.0
		ePcP			54.2		0.6			
9 July		eP	18	26	40.7	13	1.3	SE	T	Aftershock of Honduras events
		eSur		30	31.4		1.4			
9 July		eP	22	27	40.4	1	0.8		T	
10 July		eP	00	06	42.6	1	0.6		T	
10 July		eP	00	15	38.6	7	0.7	SE	T	

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
10 July		eP	00	30	01.3	1	0.3		R	
		e			16.2		0.4			
		e			26.5		0.5			
		eSur		32	10.0	999				
10 July		eP	01	13	50.4	7	1.0	SE	T	
		e		14	07.0		0.9			
		e			26.6		0.7			
10 July		eP	04	00	00.0	114	1.9		T	Chile - Bolivia border
		epP			27.3		2.0			19.2 S 68.4 W
		e(PcP)			41.2		0.9			h about 117 km
		e(PcP)			44.7		1.0			0 = 03 49 56.4
		e(pPcP)		01	14.7		1.0			Medium surface waves
		ePP		02	16.6		2.0			on LP
	E	eS		08	07.6		2.0			
		e(sS)			54.7		2.0			
	N	eScS		09	40.0		1.5			
	N	e		10	32.0		2.0			
	LP	e		12	55		25.0			
	LP	e		15	10		18.0			
	LP	eSur		18	50					
		e(P'P')		29	26.0		1.5			
		e(P'P')			54.2		1.5			
10 July		eP	04	25	36.7	1	0.9		T	
10 July		eP	05	05	01.1	1	1.0		T	
10 July		eP	08	58	04.2	2	1.2		T	
10 July		eP	12	58	06.5	41	0.8		T	Off coast of Jalisco, Mexico
	LPE	eS	13	01	25		15.0			18.4 N 104.9 W
	LPE	eSur		02	30					h about 20 km
	E	eSur		03	04.4		3.7			0 = 12 54 04.6 Mag. 4-1/2 (Berk) Strong surface waves on all systems

DATE	Syst.	Phase	Arrival Time G.C.T.	Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h. m. s.					
10 July		eP	13 47 54.5	1	1.0		T	
			48 06.4		1.0			
10 July		eP	14 00 39.5	4	1.2		T	
10 July		eP'	14 06 04.2	3	1.1		T	△(PP-P') = 128°
		ePP	08 10.9		1.3			
		ePKKP	15 05.6		1.4			
10 July		eP	14 22 27.3	54	1.4		T	Campeche, Mexico
	E	eSur	26 28.5		1.0			18.2 N 89.8 W
	LPN	e	30		18.0			h about 56 km
								0 = 14 18 13.7
10 July		eP	14 35 18.3	2	0.4		NR	△(S-P) = 2.0°
		eS	43.0	999				
10 July		eP	14 58 44.9	5	0.8	SE	R	
	N	eSur	15 02 10.9		0.9			
10 July		eP	16 32 50.3	1	0.7		T	
10 July		eP	16 47 20.4	1	0.4		R	
		e	40.0		0.5			
		e	43.5		0.6			
		e	47.2		0.5			
		eSur	49 30.3	999				
10 July		eP	19 35 36.0	4	1.0	SE	R	
	E	eSur	39 30.0		1.0			
10 July		eP	20 02 02.3	4	1.2		R	
	E	eSur	05 50.0		1.2			
10 July		eP	20 08 15.0	2	1.1		T	
10 July		eP	20 13 06.8	8	1.2	SE	R	
		eSur	17 00.0		1.0			

DATE	Syst.	Phase	Arrival Time G.C.T.	Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h. m. s.					
10 July		eP	21 05 52.3	2	0.4		NR	△(S-P) = 1.4°
	N	eS	06 10.7	999				
10 July		eP	21 25 22.8	3	0.9		T	
10 July		eP	23 29 05.2	11	1.1	SE	T	△(S-P) = 35°
	N	eS	34 36.5		2.5			
10 July		eP	23 46 47.0	1	0.4		NR	△(S-P) = 1.7°
		e	57.0		0.3			
		eS	47 09.0	999				
11 July		eP	00 26 56.3	2	0.4		NR	△(S-P) = 1.7°
		e	27 05.8		0.3			
	E	eS	17.9	999				
11 July		eP	01 33 14.6	3	1.0		T	Off coast of Hokkaido,
		e	27.8		0.7			Japan
								43.4 N 149.0 E
								h about 25 km
								0 = 01 20 57.8
11 July		eP	03 28 36.8	1	1.0		T	
11 July		eP	05 58 56.7	2	0.8		T	Kermadec Islands region
		e	59 06.7		1.0			27.3 S 177.1 W
								h about 58 km
								0 = 05 45 29.5
11 July		eP	08 24 37.7	2	1.0		T	
11 July		eP'	09 50 56.7	3	0.9		T	Nicobar Islands region
		e	51 06.1		3.5			8.3 N 93.3 E
		ePP	53 41.1		2.0			h about 163 km
		e	54 43.1		2.8			0 = 09 31 57.2
	LP	eSP	10 03 50		18.0			Strong surface waves
	LP	eSPP	05 55		15.0			on LP
	LP	eSKKS	07 15		16.0			Weak surface waves
	LP	eSS	11 20		18.0			on BB

(continued on next page)

DATE	Syst.	Phase	Arrival Time G.C.T.			Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h.	m.	s.					
	LPE	e		12	00		23.0			(continued from preceding page)
	LP	e		20	00		18.0			
	LPE	e		33	55		27.0			
	LPE	e		37	52		28.0			
	LP	eSur		42	00					
11 July		eP	13	48	11.3	5	0.7	SSW	T	
11 July		eP	14	40	28.5	1	0.6		T	
11 July		eP	16	39	48.1	5	0.8		T	Tonga Islands 21.5 S 175.7 W h about 90 km 0 = 16 26 44.1
		e		40	10.5		0.8			
11 July		eP	18	03	30.0	1	0.4		R	
		e			46.4		0.5			
	E	eSur		05	26.3	999				
11 July		eP'	18	54	08.5	2	0.8		T	Banda Sea 6.7 S 125.8 E h about 579 km 0 = 18 35 54.6
		e(SKP)		56	44.2		0.7			
11 July		eP	20	09	05.5	1	0.7		T	
12 July		eP	01	21	17.0	3	1.0		T	
12 July		eP	01	39	54.5	1	0.8		T	
12 July		eP	01	44	59.6	6	1.2		T	South of Panama 4.8 N 82.9 W h about 44 km 0 = 01 38 25.2 Weak surface waves on LP
		ePP		46	12.5		1.5			
	LP	e		50	37		23.0			
	LP	eSur		55	05					
12 July		eP	03	01	24.9	4	0.9		T	Northeastern Greece 40.1 N 23.5 E h about 129 km 0 = 02 48 48.0 Weak surface waves on LP
	LP	eSur		30	00					

DATE	Syst.	Phase	Arrival Time G.C.T.			Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h.	m.	s.					
12 July		eP'	05	06	17.5	4	1.0		T	Molucca Passage 3.3 N 127.9 E h about 92 km 0 = 04 47 29.0
		ePP		07	47.0		1.5			
12 July		eP	05	14	54.1	1	1.0		T	
12 July		eP	05	16	14.8	2	0.7		T	Weak surface waves on LP
	LP	eSur		34	00					
12 July		eP	12	23	08.3	2	0.7		T	
12 July		eP	13	42	01.7	2	0.8		T	Kurile Islands 45.2 N 151.0 E h about 40 km 0 = 13 29 56.6
		e			08.8		1.2			
12 July		eP	13	53	13.2	1	0.9		T	
12 July		eP'	14	38	46.0	1	0.6		T	Medium surface waves on LP
		e			53.3		0.7			
	LP	eSur	15	25	55					
12 July		eP	14	47	07.2	2	1.2		T	
12 July		eP	18	31	53.8	11	1.2		T	Off coast of southern Chile 43.2 S 73.7 W h about 60 km 0 = 17 19 43.9
		e		32	00.5		1.3			
12 July		eP	18	56	57.6	8	1.2		T	
12 July		eP	22	44	22.7	8	1.2		T	South of Panama 4.9 N 83.0 W h about 70 km 0 = 22 37 51.5 Medium surface waves on LP
	LP	e		50	30		20.0			
	LP	eSur		54	35					

DATE	Syst.	Phase	Arrival Time G.C.T.			Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h.	m.	s.					
13 July		eP	04	14	16.5	2	1.1		T	
13 July		eP	07	10	16.4	1	0.6		T	
13 July		eP	07	31	48.7	3	1.0		T	South of Samoa Islands 16.3 S 172.7 W h about 25 km 0 = 07 18 59.2 Weak surface waves on LP
	LP	eSur	08	00	00					
13 July		eP	13	58	11.7	9	0.7		T	Tonga Islands 21.3 S 175.7 W h about 29 km 0 = 13 45 02.4
		e			32.6		1.0			
13 July		eP	18	01	10.4	3	0.2		NR	Δ(S-P) = 1.7°
		e			20.6		0.4			
	E	eS			32.1	999				
13 July		ePP	22	03	38.7	16	2.0		T	Off east coast of Formosa 22.8 N 122.7 E h about 100 km 0 = 21 44 38.0 Medium surface waves on LP
		e			53.5		2.0			
	LP	eSur		40	00					
13 July		eP	22	22	46.0	1	0.7		T	Kermadec Islands region 25.2 S 179.7 E h about 526 km 0 = 22 10 04.0
14 July		eP	00	26	28.8	2	0.4		NR	Δ(S-P) = 1.7°
		e			38.4		0.5			
	E	eS			50.5	999				
14 July		eP	00	35	43.6	3	1.1		T	

DATE	Syst.	Phase	Arrival Time G.C.T.			Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h.	m.	s.					
14 July	LP	eSur	02	00	00				T	New Britain 5.4 S 151.9 E h about 77 km 0 = 01 07 10.9
14 July		eP'	09	11	42.1	1	0.7		T	South of Java 11.8 S 112.7 E h about 63 km 0 = 08 52 19.8
14 July		eP	09	37	56.7	1	0.6		T	
				38	12.1		0.7			
14 July		eP	13	23	48.8	999		NW	L	Δ(S-P) = 0.1°
		eS			54.1	999				
14 July		eP	13	43	27.1	9	1.2	SE	T	
		e		47	25.8		1.4			
14 July		eP	15	02	41.4	4	0.8		T	
		e			57.5		1.0			
		e		06	45.2		1.4			
14 July		eP	16	53	58.1	1	0.7		T	
14 July		eP	20	54	32.2	2	0.8		T	
		e			55.9		0.9			
14 July		eP	21	53	20.7	4	0.9		T	Fox Islands, Aleutian Islands 53.7 N 169.5 W h about 54 km 0 = 21 44 15.6
		ePcP		54	29.4		0.6			
15 July		eP'	00	36	37.3	3	0.9		T	Luzon, Philippine Islands 13.1 N 120.4 E h about 52 km 0 = 00 17 49.5
		ePP		37	53.3		1.4			
		ePKKP		46	49.4		1.1			

DATE	Syst.	Phase	Arrival Time G.C.T.	Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h. m. s.					
15 July		eP	00 47 40.0	2	0.6	SE	R	
		e	47.6		0.7			
	E	eSur	51 27.7		1.0			
15 July		eP	04 03 50.3	3	1.0		T	
15 July		eP	05 38 57.9	1	1.0		T	
15 July		eP	05 54 38.4	4	0.8		T	Off southern coast of Kamchatka 48.4 N 157.6 E h about 17 km 0 = 05 43 06.7
15 July		eP'	08 16 33.1	1	1.0		T	Southwest of Macquarie Island 57.8 S 148.5 E h about 60 km 0 = 07 57 20.5
		e	59.4		1.0			
15 July	LPN	eSur	08 59 55				T	Medium surface waves on LP
15 July		eP'	14 13 44.7	2	0.8		T	Java Sea 6.8 S 116.9 E h about 565 km 0 = 13 55 26.5
		e	49.9		1.3			
		e	15 52.8		1.3			
		eSKP	16 43.2		1.2			
15 July		eP	14 41 28.5	1	0.5		R	
		eSur	42 33.1		0.7			
15 July		eP	16 04 35.4	2	1.1		T	
15 July		eP	17 04 45.0	3	1.0		T	
15 July		eP	18 46 59.4	2	0.8		T	
		e	47 21.3		0.7			
		e	48 27.5		0.7			

DATE	Syst.	Phase	Arrival Time G.C.T.	Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h. m. s.					
15 July		eP	20 45 43.4	2	0.9		T	Fiji Islands region 20.3 S 178.2 W h about 511 km 0 = 20 33 23.0
15 July		eP	22 32 38.9	10	1.3		T	
16 July		eP	00 54 41.7	3	0.9		T	Southeastern Alaska 58.6 N 137.2 W h about 44 km 0 = 00 47 53.5 Weak surface waves on SP
	E	eSur	01 06 28.7		2.8			
	LP	e	08 45		15.0			
16 July		eP	05 35 19.9	6	0.8		T	Tonga Islands 19.0 S 175.4 W h about 200 km 0 = 05 22 36.5
		epP	36 13.8		1.0			
		ePKKP	52 47.7		0.7			
16 July		eP	06 51 42.7	11	2.2		T	
16 July		eP	07 00 05.7	6	0.8		T	Tonga Islands 18.6 S 175.7 W h about 172 km 0 = 06 47 19.7 (pP) possible new event
		e(pP)	01 05.9		0.8			
	N	eS	10 44.9		2.6			
		ePKKP	17 34.1		0.7			
16 July		eP	09 23 01.6	3	1.2		T	
16 July		eP	14 15 34.6	3	1.1		T	Loyalty Islands region 22.7 S 171.2 E h about 56 km 0 = 14 01 38.7 Mag. 5-1/2 (Berk) Medium surface waves on BB and LP
	BBE	eSKS	26 23		8.0			
	LPE	eSKS	27 25		20.0			
	LP	eSP	29 00		15.0			
	LP	ePSP	50		23.0			
		ePKKP	31 33.4		0.9			
	LP	eSur	46 00					
	LP	eSur	50 00					
16 July		eP	15 10 07.2	1	0.4		L	$\triangle$(S-P) = 1.3°
	E	eS	24.2	999				

DATE	Syst.	Phase	Arrival Time G.C.T.	Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h. m. s.					
16 July	LP	eSur	16 16 00				T	Tonga Islands 19.1 S 173.7 W h about 25 km 0 = 15 33 44.2 Weak surface waves on LP
16 July		eP	19 55 07.5	1	1.0		T	
16 July	LP	eSur	20 47 00				T	Kermadec Islands 34.3 S 178.5 W h about 191 km 0 = 20 00 19.4 Weak surface on LP
	LP	eSur	49 00					
	LP	eSur	21 08 22					
16 July		eP	21 06 59.2	4	0.9	NW	T	
16 July		eP	21 20 19.3	19	0.9		T	Kurile Islands 49.3 N 155.1 E h about 29 km 0 = 21 08 45.6 Medium surface waves on LP
		e	34.3		0.9			
		e	22 50.5		1.3			
	LP	eSur	45 00					
16 July		eP	23 15 37.8	4	0.8		T	Fiji Islands region 18.0 S 178.3 W h about 591 km 0 = 23 03 26.9
17 July		iP	01 05 16.6	c 28	1.0		T	Oaxaca, Mexico 16.7 N 97.7 W h about 74 km 0 = 01 01 11.2 Strong surface waves on all systems
	LP	eS	08 35		17.0			
	E	eSur	50.0		1.0			
	LP	e	10 20		34.0			
	E	eSur	11 05.2		2.0			
	LP	eSur	12 00					
	BB	e	50		11.0			

DATE	Syst.	Phase	Arrival Time G.C.T.	Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h. m. s.					
17 July		eP	03 34 57.4	31	1.0		T	Oxaca, Mexico 17.0 N 97.8 W h about 77 km 0 = 03 30 54.7 Medium surface waves on all systems
	LP	eS	38 30		17.0			
	E	eSur	40 44.2		2.4			
	LPE	e	53		18.0			
	LP	eSur	41 50					
17 July		eP'	05 31 58.5	1	0.7		T	Iran 27.1 N 54.5 E h about 59 km 0 = 05 13 20.3 Weak surface waves on LP
		ePP	32 48.0		1.1			
	LP	eSur	06 06 30					
17 July		eP	07 56 36.5	2	1.0		T	
17 July		eP	09 12 18.5	19	1.0		T	Off coast of Mexico 16.5 N 105.0 W h about 60 km 0 = 09 08 02.1 Medium surface waves on SP and IB
	LPE	eS	15 44		17.0			
	LPE	e	17 10		20.0			
	IBE	eSur	24		6.0			
17 July		eP	09 29 35.4	6	1.2		T	Near coast of Central Chile 37.6 S 73.3 W h about 100 km 0 = 09 17 53.4
		e	45.5		1.2			
17 July		eP	11 47 12.6	6	1.0	SSE	T	
		e	23.0		0.8			
		e	48 31.0		0.8			
	LP	e	54 29		15.0			
17 July		eP	12 04 28.2	1	0.5		T	
17 July		eP	14 14 09.2	2	0.7		T	Mid-Atlantic Ocean 1.8 N 29.5 W h about 24 km 0 = 14 02 48.2 Weak surface waves on LP
	LP	eSur	37 50					

DATE	Syst.	Phase	Arrival Time G.C.T.	Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h. m. s.					
17 July	LP	eSur	15 55 00				T	Kirghiz S.S.R. 41.2 N 72.4 E h about 67 km 0 = 14 53 28.4 Weak surface waves on LP
17 July		eP	16 33 16.7	6	1.0		T	Near east coast of
		e	25.5		1.3			Honshu, Japan
		ePP	36 54.7		1.8			35.7 N 141.2 E
	LPE	eSKS	43 55		15.0			h about 75 km
	LPE	ePS	45 22		22.0			0 = 16 20 22.6
	LP	eSur	17 02 00					Medium surface waves
	LP	eSur	04 30					on LP Weak surface waves on BB
17 July		eP	18 03 06.0	2	0.2		NR	$\triangle$(S-P) = 1.7°
	E	eS	27.4		0.4			
17 July		eP	18 28 06.0	2	0.4		NR	$\triangle$(S-P) = 1.7°
		e	15.5		0.4			
	E	eS	27.2		0.5			
18 July		eP	03 44 27.5	1	0.7		T	
18 July		eP	05 58 49.4	1	0.7		T	
18 July		eP	08 12 47.2	4	0.5		NR	($\triangle$ S-P = 3.5°)
		e(S)	13 28.6		0.6			
18 July		eP	09 57 10.0	5	0.8	SSE	T	
		e	24.4		0.7			
18 July		eP	09 59 19.3	5	0.6	SSE	T	
18 July		eP'	13 22 44.0	4	1.0		T	Banda Sea 5.9 S 128.5 E h about 25 km 0 = 13 03 28.3

DATE	Syst.	Phase	Arrival Time G.C.T.	Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h. m. s.					
18 July		eP	14 17 24.0	109	2.0		T	Northern Ryukyu Islands
		ePP	21 28.0		2.2			29.4 N 131.6 E
	LP	e	26 00		16.0			h about 21 km
	LPE	eSKS	28 00		17.0			0 = 14 03 36.5
	LPE	eSKS	29 00		20.0			Mag. 6-1/2 -6-3/4 (Pas)
	LPE	ePS	30 26		25.0			6-3/4 - 7 (Berk), 6-1/2 (Pal)
	LPE	ePPS	31 20		28.0			Strong surface waves on
		ePKKP$_1$	33 42.8		1.5			all systems
		ePKKP$_2$	34 04.0		1.8			
	LPE	e(SS)	35 00		23.0			
		e(PcPP')	37 57.0		2.2			
	LPE	eSSS	39 25		32.0			
		e	41 13.3		2.5			
		e(P'P')	46.0		2.5			
	LP	eSur	52 00					
		eSur	55 50.0		3.0			
		eP'P'P'	15 03 07.6		2.0			
18 July		eP	14 47 48.6	26	1.7		T	Northern Ryukyu Islands
		ePP	51 57.0		1.9			29.9 N 131.2 E
		ePKKP	15 04 05.0		1.6			h about 72 km
		e	28.5		1.0			0 = 14 34 07.3
		e	39.2		1.2			LP phases covered by surface waves from previous event
18 July		eP	15 30 03.7	9	1.8		T	Northern Ryukyu Islands
		ePP	34 04.0		2.0			29.5 N 131.3 E h about 35 km 0 = 15 16 12.5 Possible LP phases covered by previous events
18 July		eP	15 55 18.2	1	0.2		NR	$\triangle$(S-P) = 1.7°
		e	28.0		0.4			
	E	eS	39.7		0.5			
18 July		eP	16 33 53.3	11	0.7		T	Catamarca Province,
		e	34 16.8		0.7			Argentina 28.0 S 66.4 W h about 80 km 0 = 16 22 48.9

DATE	Syst.	Phase	Arrival Time G.C.T.	Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h. m. s.					
18 July		eP	16 48 31.7	2	0.5		R	
		e	43.3		0.5			
	E	eSur	50 15.0		0.8			
18 July	LP	eSur	20 14 00				T	Northern Ryukyu Islands 29.3 N 131.6 E h about 60 km 0 = 19 29 04.8 Weak surface waves on LP
18 July		eP	21 05 40.8	2	0.8		T	
18 July		eP'	21 45 34.6	4	0.8		T	Arabian Sea 13.8 N 56.6 E h about 43 km 0 = 21 26 30.5
19 July		eP	00 00 03.9	3	0.2	SE	NR	$\triangle$(S-P) = 1.7°
		e	13.3		0.4			
	E	eS	25.1		0.5			
19 July		eP	00 23 27.6	2	0.9		T	Off west coast of Honshu, Japan 40.6 N 139.5 E h about 25 km 0 = 00 10 39.1
19 July	LP	eSur	00 36 00				T	Northern Ryukyu Islands 29.7 N 131.4 E h about 39 km 0 = 23 42 36.5 Weak surface waves on LP
19		eP'	04 09 13.5	1	0.5		T	Sandwich Islands 58.8 S 25.3 W h about 39 km 0 = 03 50 42.0 Medium surface waves on LP
		ePKKP	20 20.0		0.9			
	LP	eSur	45 00					

DATE	Syst.	Phase	Arrival Time G.C.T.	Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h. m. s.					
19 July		ePP	06 50 54.0		2.0		T	Northern Ryukyu Islands 29.6 N 131.7 E h about 27 km 0 = 06 33 18.1 Weak surface waves on LP
	LP	eSur	07 26 00					
19 July		eP	07 14 16.6	3	0.8		T	
19 July		eP	09 32 18.4	1	1.0		T	Off coast of Honshu, Japan 37.5 N 142.0 E h about 25 km 0 = 09 19 24.2
19 July		eP	09 32 48.6	7	1.2		T	
19 July		eP	09 32 59.7	21	1.2	SE	T	Possible phase
19 July		eP	10 50 34.0	2	0.9		T	
19 July		eP	10 52 30.6	2	0.8		T	
19 July		eP	10 59 17.0	1	0.6		T	Weak surface waves on LP
	LP	e	11 16 00		15.0			
	LP	eSur	30 45					
19 July		eP	12 12 31.2	7	1.5		T	Northern Ryukyu Islands 29.6 N 131.5 E h about 31 km 0 = 11 58 43.7 Weak surface waves on LP
		ePP	16 34.8		2.0			
	LPE	ePS	25 45		15.0			
	LP	eSur	46 00					
19 July		eP	12 29 11.1	3	1.0		T	
19 July		eP	16 37 19.4	5	0.9		T	
19 July		eP	18 11 17.4	2	0.4	SE	NR	$\triangle$(S-P) = 1.7°
		e	27.0		0.4			
	E	eS	39.0	999				

DATE	Syst.	Phase	Arrival Time G.C.T.	Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h. m. s.					
19 July		eP	18 13 22.6	4	1.0		T	Samoa Islands region
		e	14 01.5		1.3			19.8 S 173.9 W
	LP	eSur	43 00					h about 66 km
								0 = 18 00 28.5
								Weak surface waves on LP
19 July		eP	21 27 28.2	2	0.2		NR	△(S-P) = 1.7°
	E	eS	49.2		0.4			
19 July		eP	22 39 36.2	2	0.8		T	
19 July		eP	22 46 10.3	2	0.8		T	Andreanof Islands,
	LP	eSur	23 06 23					Aleutian Islands
								51.7 N 173.4 W
								h about 42 km
								0 = 22 36 36.5
								Weak surface waves on LP
19 July		eP	23 13 46.6	6	1.0		T	Near coast of Greece
		e	55.7		0.9			37.7 N 20.2 E
		ePP	17 13.0		1.3			h about 37 km
	LPE	e	24 30		15.0			0 = 23 00 56.7
	LP	eSur	42 00					Weak surface on LP
19 July		eP	23 30 04.4	2	0.2		NR	△(S-P) = 1.7°
	E	eS	25.5		0.5			
19 July		eP	23 39 11.9	1	0.4		NR	△(S-P) = 2.2°
	E	eS	39.5		0.5			
20 July		eP	02 23 48.1	4	1.2		T	
20 July		eP	02 36 15.4	13	0.9	NW	T	
		e	28.5		0.9			
		e	37 00.9		1.1			
20 July		eP	06 13 07.9	19	1.8	SE	T	
20 July		eP	07 06 34.1	2	1.0		T	

DATE	Syst.	Phase	Arrival Time G.C.T.	Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h. m. s.					
20 July		eP	07 16 47.3	2	0.9		T	
20 July	LPN	eSur	07 39 45				T	Medium surface waves on LP
20 July		eP	08 48 16.0	9	1.0		T	Off coast of Jalisco, Mexico
		e	24.8		1.1			18.7 N 103.0 W
		e	37.1		1.1			h about 14 km
	E	eSur	53 10.1		3.5			0 = 08 44 21.1
	LP	e	54 55		14.0			Strong surface on SP and IB
20 July		eP	09 16 27.8	6	1.5		T	Northern Ryukyu Islands
		ePP	20 29.3		2.0			28.4 N 133.6 E
	LP	eSur	51 00					h about 25 km
								0 = 09 02 31.9
								Very weak surface waves on LP
20 July		eP	10 39 52.1	3	0.9		T	South of Panama
	LP	eSur	52 00					4.6 N 82.1 W
								h about 50 km
								0 = 10 33 14.3
								Weak surface waves on LP
20 July		eP	13 28 27.0	11	1.0		T	Southern Bolivia
		e	29 03.3		0.9			20.7 S 64.7 W
								h about 128 km
								0 = 13 18 04.2
20 July		eP	15 22 39.5	10	0.8		T	Fiji Islands
		e	24 52.2		1.7			17.5 S 178.7 W
	E	eSKS	32 22.2		2.2			h about 570 km
								0 = 15 10 26.7
20 July		eP	16 43 37.9	1	0.8		T	
20 July		eP	16 58 01.6	5	1.3		T	
20 July		eP	17 02 04.9	1	0.6		T	
		e	21.0		1.0			

DATE	Syst.	Phase	Arrival Time G.C.T.	Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h. m. s.					
20 July		eP	17 36 08.5	2	0.6		T	
		e	37 36.1		0.7			
20 July		eP	18 59 58.6	5	0.8		T	
		e	19 00 07.7		0.9			
20 July		eP	20 38 56.6	2	0.7		R	SP horizontals inoperative
		e(Sur)	40 35.5		0.8			
20 July	LPE	e	20 41 35		14.0		T	Kermadec Islands 31.8 S 177.2 W h about 44 km 0 = 19 58 03.3 Medium surface waves on LP
	LP	eSur	44 10					
21 July		eP	04 41 43.8	4	0.9		T	Medium surface waves on LP
	LP	eSur	57 37.0					
21 July		eP	07 49 15.5	2	0.8		T	
21 July		eP	08 02 31.0	1	0.6		T	
21 July	LP	eSur	08 31 10.0				T	Santa Cruz Islands 11.3 S 166.0 E h about 93 km 0 = 07 44 09.1 Medium surface waves on LP. LPE inoperative
21 July		eP	08 38 24.1	2	0.5		T	
21 July		eP	17 15 54.2	3	0.8		T	
21 July		eP	17 49 34.5	1	0.5		T	Phase @ 17 51 29.1 possible new event
		e	51 29.1		0.5			

DATE	Syst.	Phase	Arrival Time G.C.T.	Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h. m. s.					
21 July		eP	19 18 29.3	2	0.8		T	Tonga Islands region 22.4 S 176.0 W h about 25 km 0 = 19 05 15.3
21 July		eP	19 21 21.2	2	0.7		T	
21 July		e(P)	23 37 46.6	7	1.1		T	
22 July		eP	02 55 47.2	3	1.0		T	Tonga Islands region 24.7 S 175.4 W h about 100 km 0 = 02 42 36.1
22 July		eP'	10 15 58.9	8	0.9		T	Java 7.4 S 107.9 E h about 142 km 0 = 09 56 35.1
22 July		eP	10 41 01.2	2	1.0		T	Tonga Islands region 20.2 S 174.0 W h about 25 km 0 = 10 27 51.8
22 July		eP	11 23 42.8	2	0.9		T	
22 July		e(P)	11 43 48.6	4	0.7		T	
22 July		eP	14 15 50.2	4	1.0		T	
22 July		eP	16 29 45.3	18	0.6	SE	T	
		e	36 34.8		0.6			
22 July		eP'	18 31 50.6	5	1.1		T	South of Tasmania
		e	32 06.0		1.2			54.0 S 141.2 E
		eSKP	35 17.8		1.6			h about 84 km 0 = 18 12 31.1
22 July		eP	51 23.8	1	1.0		T	

DATE	Syst.	Phase	Arrival Time G.C.T.			Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h.	m.	s.					
22 July		eP	21	07	27.9	4	0.9		T	
		e			42.2		0.6			
23 July		eP	00	09	10.4	47	1.2		T	Jalisco, Mexico
		e			24.3		1.1			20.2 N 105.1 W
	E	eSur		13	42.3		3.0			h about 48 km
		e		16	21.5		1.2			0 = 00 05 31.9
		e			35.4		1.2			Strong surface on SP, IB,
	E	e		17	14.2		1.4			and BB
		e(Sur)		21	03.1		3.0			Phases at 00 16 21.5 and 00 16 35.4 possible after-shocks
23 July		eP	01	50	00.0	1	0.8		T	
23 July		eP	02	39	42.4	1	1.0		T	
23 July		eP	03	59	52.9	1	0.8		T	
23 July		eP	11	04	53.3	7	1.5		T	
23 July		eP	11	39	54.5	1	0.8		T	Jujuy Province, Argentina
										23.5 S 66.3 W
										h about 168 km
										0 = 11 29 22.3
23 July		eP	12	20	16.9	5	1.0		T	Southern Bolivia
		e(PcP)			52.4		0.7			21.4 S 67.2 W
										h about 241 km
										0 = 12 10 10.9
23 July		eP	13	46	38.3	2	0.8		T	Northern Chile
		e(PcP)		47	00.2		0.6			25.4 S 68.9 W
										h about 35 km
										0 = 13 35 51.6

DATE	Syst.	Phase	Arrival Time G.C.T.			Ground Motion A	Ground Motion T	Dir.	Type	Remarks
23 July		eP	14	17	43.9	3	1.0		T	New Hebrides Islands
		ePP		21	42.4		1.5			18.5 S 168.2 E
		e		22	21.3		1.6			h about 44 km
		e		27	23.6		1.3			0 = 14 03 39.8
	BBE	eSKS		28	28.0		12.0			Mag. 5-3/4 - 6 (Berk)
	BBE	ePS		30	55.0		11.0			
23 July		eP	14	44	56.1	57	1.1		T	Pacific Ocean about 2000
	BB	iP			57.0	d2357	6.0			miles NW of Galapagos Isl.
	BB	ePP		46	22.0		6.0			6.9 N 123.5 W
		ePcP		47	22.8		1.0			h about 89 km
	BB	e			30.0		9.0			0 = 14 38 05.5
	BBE	eS		50	37.0		5.5			LP system inoperative
	BBE	e		53	25.0		8.0			BBN inoperative
		e		54	40.8		1.0			Mag. 5-3/4 - 6 (Pas)
	BBE	eSur		55	33.0					and (Berk)
	BBE	eSur		56	46					Strong surface on SP, IB,
		e(P'P')	15	17	25.6		1.0			and BB
										Phase @ 14 54 40.8
										possible new event
23 July		eP	15	33	23.3	2	0.9		T	Hawaii
										19.5 N 155.2 W
										h about 44 km
										0 = 15 24 15.1
23 July		eP	15	44	13.0	7	1.5		T	New Hebrides Islands
		e		47	23.2		1.2			18.5 S 168.0 E
		ePP		48	32.2		1.6			h about 107 km
		ePKKP	16	00	13.0		0.7			0 = 15 30 22.8
		e			45.6		1.3			
23 July		eP	16	43	58.8	1	0.9		T	
23 July		eP	20	33	52.5	2	1.1		T	

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
23 July	BB	iP	22	05	03 c10,714	15.0			T	New Hebrides Islands
	BB	e		08	17		9.0			18.3 S 168.3 E
	BB	ePP		09	18		8.0			h about 44 km
		e		10	23.8		3.1			0 = 21 51 07.5
	BB	eSKS		15	35		11.0			LP system inoperative
	BBE	ePS		18	23	999				BBN inoperative
	BBE	ePPS		19	26	999				Phase at 22 08 17.0
		ePKKP		21	11.0		1.0			possible new event.
		e			37.2		0.9			Strong surface waves
	BBE	e(PKKS)		24	22	999				on SP, IB and BB
		e		25	25.7		2.7			
	BBE	eSur		39	33					
	BBE	eSur	23	43	20					
23 July		eP	22	28	54.3	83	1.7	SW	T	
23 July		eP	22	47	22.6	28	1.2	SW	T	
23 July		eP	22	53	11.2	3	1.0		T	
24 July		eP	00	00	25.6	2	1.0		T	New Hebrides Islands
										18.4 S 167.8 E
										h about 25 km
										0 = 23 46 17.2
24 July		eP	01	43	14.6	3	0.9		T	Fiji Islands region
		epP		45	30.0		1.1			21.1 S 179.3 W
		ePP		47	08.6		1.1			h about 642 km
	E	eSKS		52	53.3		1.4			0 = 01 30 56.6
										LP system inoperative
24 July		eP	02	01	11.1	39	0.8		T	Ecuador
		ePcP		03	11.4		0.8			2.3 S 79.6 W
		eScP		07	10.2		1.1			h about 25 km
										0 = 01 53 26.7
										LP system inoperative
24 July		eP	02	15	02.3	12	0.8		T	Central Ecuador
		e			11.0		0.7			1.6 S 78.3 W
		ePcP		17	02.0		0.8			h about 30 km
										0 = 02 07 18.6

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
24 July		eP	02	59	34.3	2	0.4		NR	Δ(S-P) = 1.7°
		e			43.8		0.4			
	E	eS			55.9	999				
24 July		eP	07	00	28.6	1	1.0		T	
24 July		eP	08	52	49.0	1	1.0		T	
24 July		eP'	09	07	04.6	14	1.3		T	Northern Celebes region
		e		08	02.7		0.7			0.0 124.1 E
		ePP			55.2		1.3			h about 159 km
		e		09	58.2		1.0			0 = 08 48 13.8
		e		10	23.0		1.1			LP system inoperative
		e		12	41.1		1.0			BBN inoperative
24 July		eP	10	10	26.4	2	1.1		T	
24 July		eP	10	45	09.5	6	1.0		T	Vancouver Island
		e			47.5		1.1			50.6 N 128.9 W
										h about 25 km
										0 = 10 39 23.7
24 July		eP	15	14	15.5	2	0.6		NR	Δ(S-P) = 1.7°
		e			25.2		0.4			
	E	eS			37.0		0.5			
24 July		eP	16	23	10.5	3	1.0		T	
24 July		e(P)	17	15	06.8	1	0.4		R	
		e			15.4		0.6			
		e		16	28.6		0.6			
	E	eSur			32.7		1.0			
24 July		eP	18	13	48.8	2	0.3		NR	Δ(S-P) = 1.7°
		eS		14	10.2	999				
24 July		eP	19	42	56.5	1	0.5		NR	Δ(S-P) = 3.2°
		e		43	03.5		0.4			
	E	eS			34.2		0.6			

DATE	Syst.	Phase	Arrival Time G.C.T.			Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h.	m.	s.					
24 July		eP	23	26	32.5	3	0.3		NR	△(S-P) = 1.7°
		e			42.4		0.3			
		eS			54.0	999				
24 July		eP	23	29	07.7	1	0.3		NR	△(S-P) = 1.7°
		e			17.6		0.4			
	E	eS			28.8	999				
25 July	LP	eSur	02	22	15				T	New Hebrides Islands 18.3 S 168.3 E h about 99 km 0 = 01 30 33.2 Medium surface waves on LP
25 July		eP	02	25	42.3	1	0.8		T	
25 July		iP	02	56	18.9	d 42	0.6		T	Western Brazil 8.8 S 71.3 W h about 642 km 0 = 02 48 13.5 P'P' not present
		ePcP		57	26.6		0.6			
		epP		58	08.6		1.0			
		eScP	03	00	26.2		0.8			
	E	eS		02	48.7		1.0			
		eScS		05	05.4		1.5			
25 July		eP	05	19	56.0	10	0.9		T	
		e		20	06.4		0.8			
		e			30.6		0.7			
		e		26	01.4		1.1			
25 July		eP	06	10	26.3	6	0.7		T	Near east coast of Kamchatka 55.3 N 163.9 E h about 25 km 0 = 05 59 39.3
		e			36.6		0.8			
25 July		eP'1	08	21	13.9	3	1.2		T	Indian Ocean about 900 miles NE of Kerguelen Islands 38.2 S 78.6 E h about 19 km 0 = 08 00 56.9
		eP'2		22	45.1	2	0.9			
		e		30	11.8		1.9			

DATE	Syst.	Phase	Arrival Time G.C.T.			Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h.	m.	s.					
25 July		eP	10	14	35.3	2	0.9		T	Tonga Islands 18.3 S 175.7 W h about 238 km 0 = 10 02 00.5
25 July		ePP	12	20	18.5		1.6		T	Off east coast of Formosa 21.0 N 123.6 E h about 61 km 0 = 12 00 59.6
		ePKKP		30	27.1		0.7			
25 July		eP	18	17	06.3	3	1.0		T	
25 July		eP	18	53	59.3	6	0.8	NW	T	
		e		57	30.8		1.3			
25 July		eP'	18	58	27.8	31	1.6		T	Northern Celebes 0.0 124.7 E h about 43 km 0 = 18 38 24.0 Weak surface on LP
		e		59	25.3		0.9			
		ePP	19	00	21.5		1.8			
		e		01	42.3		1.3			
	LP	eSur		38	57					
25 July		eP	19	07	57.5	2	1.1		T	
		e		10	47.9		1.0			
		e		11	22.8		1.1			
26 July		eP	00	48	46.0	1	0.3		NR	△(S-P) = 1.7°
		e			55.4		0.3			
		eS		49	07.4	999				
26 July		iP	01	45	32.4	c 14	1.1		T	Southeast of Easter Island 35.7 S 104.5 W h about 24 km 0 = 01 34 18.2
		e			39.0		1.2			
26 July		eP'	03	14	57.4	4	1.0		T	Banda Sea 7.5 S 128.0 E h about 96 km 0 = 02 55 59.9
		e		18	06.8		1.5			

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
26 July		eP	09	33	07.9	1	1.0		T	North Island, New Zealand
		ePP		37	24.7		1.6			37.1 S 177.3 E
										h about 100 km
										0 = 09 18 59.9
26 July		eP	11	34	40.7	2	0.8		T	
26 July		eP	12	06	51.6	2	0.7		T	
26 July		eP	13	06	46.0	28	0.5	SE	T	Weak surface waves on LP
	LP	e		11	30		14.0			
	LP	e		12	58		15.0			
	LP	eSur		21	10					
26 July		eP	14	07	06.3	2	0.7		T	Medium surface waves
	LP	eSur		22	40					on LP
26 July		eP	16	40	01.6	3	0.6	SE	R	
	E	eSur		43	47.8		0.7			
26 July		eP	19	22	57.9	14	0.4		NR	$\triangle$(S-P) = 1.6°
		eS		23	18.8	999				
26 July		eP	23	52	06.0	2	0.8		R	
		eSur		55	57.0		0.9			
27 July	LP	eSur	02	52	28				T	Kermadec Islands
										30.4 S 178.7 W
										h about 482 km
										0 = 02 07 24.4
										Medium surface waves on LP may not be associated with this deep focus event.
27 July		eP	05	31	49.8	2	1.1		T	
27 July		eP	06	19	23.2	5	0.9		T	Bolivia - Chile border
		e			36.0		0.9			18.2 S 69.8 W
		ePcP		20	12.8		0.5			h about 31 km
										0 = 06 09 23.5

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
27 July		eP	08	39	57.7	1	0.5		T	Fiji Islands region
										17.2 S 178.1 W
										h about 562 km
										0 = 08 27 46.9
27 July		eP	10	53	26.2	1	0.6		T	
		e			35.5		0.9			
27 July		eP	15	37	28.1	1	0.4	SSE	R	
		e			42.4		0.4			
		e			50.2		0.4			
		e			53.5		0.6			
		eSur		39	35.1	999				
27 July	LP	eSur	16	22	05				T	Strong surface waves
										on LP
27 July		eP	18	15	00.0	1	0.4		NR	$\triangle$(S-P) = 1.8°
	E	eS			22.2		0.6			
27 July		eP	18	48	57.6	1	0.7		T	Aegean Sea
										35.2 N 25.4 E
										h about 55 km
										0 = 18 35 48.5
27 July		eP	19	10	17.4	1	0.7		T	Jujuy Province, Argentina
		e		11	39.3		1.0			23.1 S 67.2 W
	LPE	e(ScS)		19	40		15.0			h about 246 km
										0 = 19 00 02.
27 July		eP	19	14	40.3	3	1.0		T	
27 July		eP	20	16	18.9	2	0.9		T	
27 July		eP	21	00	14.1	1	0.4		NR	$\triangle$(S-P) = 2.0°
	N	eS			38.8		0.5			
27 July		eP	21	06	39.1	1	0.6		T	
		e		07	56.1		0.6			

DATE	Syst.	Phase	Arrival Time G.C.T.			Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h.	m.	s.					
28 July		eP	00	12	16.9	18	0.8		T	Lake Baikal region U.S.S.R.
		e		16	40.7		1.2			53.2 N 111.1 E
		ePKKP		29	54.0		0.6			h about 63 km
	LP	eSur		53	00					0 = 23 59 25.6
										Weak surface waves on LP
28 July		eP'	00	20	02.0	1	0.6		T	North of Celebes
										4.5 N 125.6 E
										h about 89 km
										0 = 00 01 14.9
28 July		eP	00	43	16.8	2	0.8		T	
28 July		eP	00	48	15.2	2	0.8		T	Ryukyu Islands
		ePP		52	30.6		2.2			27.0 N 126.6 E
		ePKKP	01	04	10.0		0.8			h about 136 km
										0 = 00 34 18.3
28 July		iP	01	13	08.0	c 999			T	Ecuador
	LP	e(pP)			40		25.0			2.2 S 77.1 W
	BB	ePP		15	10		9.0			h about 136 km
		e			40.0		1.2			0 = 01 05 30.0
		eScP		18	39.2		1.3			Mag. 6-1/4 (Pas),
	LPE	eS		19	18		19.0			5-3/4 - 6 (Berk)
		e			45.4		1.6			Strong surface waves
	BBE	e		20	07		10.0			on BB and LP
	BBE	eSS		22	40		8.0			
	IBE	eScS			55		4.0			
	LP	eSur		26	00					
28 July		eP	01	30	56.0	1	0.4		NR	Δ(S-P) = 2.7°
	E	eS		31	28.8		0.6			
28 July		eP	01	35	53.8	1	0.9		T	
28 July		eP	01	42	31.9	1	0.6		T	
28 July		eP	01	44	30.8	17	2.0		T	Phase at 01 47 06.4
		e		47	06.4		1.6			possible new event

DATE	Syst.	Phase	Arrival Time G.C.T.			Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h.	m.	s.					
28 July		eP	01	55	01.2	4	1.2		T	
28 July		eP	04	56	51.4	1	0.8		T	
28 July		eP	06	25	39.4	4	1.2		T	New Hebrides Islands
	BB	e		28	39		6.0			18.6 S 167.7 E
	BB	ePP		29	58		9.0			h about 41 km
	BBE	eSKS		36	17		10.0			0 = 06 11 38.7
	LP	eSP		39	00		17.0			Mag. 5-3/4 (Berk)
	LPE	ePPS			50		18.0			Strong surface waves
		ePKKP		41	38.7		0.6			on LP and BB
	LPE	eSS		44	19		22.0			
	LPE	e(PKKS)		45	20		16.0			
	LP	eSur	07	00	18					
	LP	eSur		15	30					
	LP	eSur		18	41					
28 July		eP	06	49	31.0	1	0.7		T	
28 July		eP	06	49	31.0	1	0.7		T	
		e		51	56.0		0.8			
	N	eSur		54	48.0		2.4			
28 July		eP	10	17	52.6	183	2.1		T	Pacific Ocean, west of
	BB	e		19	39		6.0			Jalisco, Mexico
	BB	e		20	23		5.0			20.0 N 109.2 W
	LPE	iS		21	12		18.0			h about 42 km
	LPE	eSur		22	36					0 = 10 13 51.1
	E	eSur		23	02.9		3.4			Mag. 5-1/2 (Berk),
	E	eSur			33.2		5.1			5 (Pal)
		e(ScP)		25	57.2		5.5			Very strong surface
		eP'P'		53	50.2		1.1			waves on all systems
										Phase at 10 53 50.2
										may be new event
28 July		eP	10	42	19.7	44	1.0		T	Pacific Ocean, west of
	LPE	eS		45	39		15.0			Jalisco, Mexico
	LPE	eSur		47	02					20.2 N 109.1 W
	E	eSur			59.1		8.3			h about 106 km
	E	eSur		48	25.2		5.0			0 = 10 38 28.2
	N	eSur			54.0		5.2			Mag. 5-1/4 - 5-1/2 (Berk)
										Very strong surface waves
										on all systems

DATE	Syst.	Phase	Arrival Time G.C.T.	Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h. m. s.					
28 July		eP	10 53 50.6	10	1.3		T	
28 July		eP	11 04 50.8	3	1.0		T	
28 July		eP	11 13 22.6	1	0.8		T	
28 July		eP	12 51 35.1	2	0.6		T	Tonga Islands 17.1 S 173.0 W h about 25 km 0 = 12 38 45.3
28 July		eP'	13 39 40.9	2	0.8		T	Celebes
		e	40 22.2		1.0			0.6 S 122.4 E
		ePP	41 48.1		1.2			h about 35 km
		e(SKP)	43 01.6		2.2			0 = 13 20 33.8
		e(SKKP)	52 39.1		1.5			Strong surface waves
	LP	eSur	14 20 00					on LP
28 July		eP	14 57 03.4	1	0.7		T	
28 July		eP	15 08 14.9	3	0.8		T	
		e	25.8		0.6			
28 July		eP	15 32 01.1	11	1.1		T	Kurile Islands
		e	12.9		1.4			43.4 N 146.1 E
		e	18.3		0.9			h about 34 km
		e	45.4		1.1			0 = 15 19 40.0
		e	36 54.4		1.4			Weak surface waves
	LP	eSur	16 00 35					on LP
28 July		eP	17 12 17.9	3	1.0		T	
28 July		eP	17 30 51.3	1	0.8		T	Loyalty Islands 20.5 S 169.9 E h about 147 km 0 = 17 17 07.8
28 July		eP	17 46 49.7	1	0.7		T	
		e	47 10.0		0.8			

DATE	Syst.	Phase	Arrival Time G.C.T.	Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h. m. s.					
28 July		eP	18 26 06.9	1	0.8		R	
	N	eSur	28 37.6		0.6			
28 July		eP	18 49 44.9	1	0.7		T	
28 July		eP	18 54 27.1	2	0.9		T	
28 July		eP	19 20 58.8	2	0.9		T	
28 July		eP	19 37 57.1	1	0.3		NR	$\triangle$(S-P) = 3.4°
	N	eS	38 37.8		0.6			
28 July		eP	20 15 01.8	2	0.9		T	
28 July		eP	20 50 08.1	1	0.4		NR	$\triangle$(S-P) = 4.4°
		e	42.2		0.5			
	N	eS	59.0		0.7			
29 July		eP	00 23 17.5	1	0.6		T	
29 July		eP	00 37 10.5	1	0.2		NR	$\triangle$(S-P) = 2.6°
	E	eS	41.5		0.4			
29 July		eP	02 12 30.0	1	1.0		T	
29 July		eP	10 45 12.9	4	1.3		T	Fiji Islands
		e	39.9		1.4			16.6 S 174.1 E
	LP	eSur	11 16 45					h about 132 km
								0 = 10 31 52.5
								Medium surface waves
								on LP
29 July		eP	12 14 38.6	2	0.9		T	Weak surface waves
	LP	e	24 00		25.0			on LP
	LP	e	46 00		25.0			
	LP	eSur	53 15					

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
29 July		eP	16	40	36.9	29	1.2		T	Tonga Islands region
		e			49.6		0.8			23.9 S 176.1 W
	LP	e		44	40		20.0			h about 26 km
	E	eSKS		51	12.6		2.8			0 = 16 27 19.0
	BBE	eS			50		7.0			Mag. 5-1/2 (Berk)
	LP	eSP		53	00		18.0			Strong surface waves
		ePKKP		57	41.1		0.8			on LP
		e		58	08.1		0.7			Weak surface waves
	LP	eSS			18		30.0			on BB
	LPE	eSur	17	07	00					
	LP	eSur		11	10					
29 July		eP	21	03	01.0	1	0.3		NR	$\triangle$(S-P) = 4.5°
	N	eS			53.5		0.7			
29 July		eP	21	24	29.2	3	1.0		R	Medium surface waves
		e		25	36.2		1.1			on all systems
		e			45.8		1.1			
	E	eSur		28	05.0		1.7			
	BBE	eSur			28					
	E	eSur			37.0		1.7			
	BBE	eSur		29	21					
29 July		eP	23	03	37.5	3	1.3		T	
30 July	N	eP	00	27	43.5	2	0.4		NR	$\triangle$(S-P) = 2.9°
		eS		28	27.7		0.5			
30 July		eP	02	50	26.6	9	1.0		T	Sumatra
										3.8 S 103.4 E
										h about 146 km
										0 = 02 31 10.3
30 July		eP	07	33	52.8	3	0.6		T	Northern Peru
		ePP		35	36.6		0.7			5.3 S 79.2 W
										h about 25 km
										0 = 07 25 42.4

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
30 July	LP	eSur	09	08	00				T	Near north coast of New
										Guinea
										7.0 S 146.1 E
										h about 44 km
										0 = 08 08 07.7
										Weak surface waves on LP
30 July		eP	10	18	56.7	5	1.1		T	
30 July		eP	11	54	42.2	1	1.0		T	
30 July		eP	14	13	12.3	2	1.0		T	
30 July	LP	eSur	14	54	00				T	New Hebrides Islands
										18.1 S 168.7 E
										h about 48 km
										0 = 14 06 17.9
										Weak surface waves on LP
30 July		eP	15	49	15.8	6	1.4		T	Tonga Islands
	LP	eSur	16	21	00					20.6 S 174.1 W
										h about 25 km
										0 = 15 36 13.7
										Weak surface waves on LP
30 July		eP	17	44	07.9	4	1.2		T	
30 July		eP	19	54	44.2	2	0.2		L	$\triangle$(S-P) = less than 0.1°
		e			45.3		0.2			
		eS			47.8	999				
30 July		eP	21	56	46.7	3	0.8	SE	T	
30 July		eP	21	57	21.8	2	0.7		T	Possible phases of previous
		e			40.4		1.0			event
30 July		eP	22	54	01.7	3	0.6	NW	T	
30 July		eP	23	17	11.0	2	0.9		T	

DATE	Syst.	Phase	Arrival Time G.C.T.	Ground Motion A	T	Dir.	Type	Remarks
1961			h. m. s.					
31 July		eP	00 11 17.6	4	0.8		T	San Luis Obispo County, California
		e	46.5		1.2			35.5 N 120.4 W
		e	12 52.5		1.3			h about 23 km
	LPE	e	15 00		17.0			0 = 00 07 07.0
	N	eSur	16 23.0		2.6			Mag. 4-1/2 (Pas)
	LPE	eSur	17 00					4-1/4 - 4-1/2 (Berk)
	BBN	eSur	24					LPZ_1 and LPZ_2 inoperative.
								Medium surface waves on all systems
31		eP'	00 35 04.5	3	0.8		T	Off north coast of Java
		e	21.6		1.0			5.3 S 107.2 E
		e	36 01.4		1.0			h about 244 km
								0 = 00 15 55.3
31 July		eP	00 46 37.6	3	1.0		T	
31 July		eP	05 15 26.2	2	0.9		T	
31 July		eP	06 17 26.0	2	0.6		T	
		e	32.3		0.7			
		e	36 0		0.8			
31 July		eP	07 09 25.2	10	0.9		T	
31 July		eP	10 55 56.2	2	0.9		T	
31 July		eP	18 03 08.0	1	0.2		NR	Δ(S-P) =1.7°
		e	17.8		0.3			
		eS	29.4		0.4			
31 July		eP	19 28 02.9	2	0.8		T	Flores
								9.7 S 117.6 E
								h about 32 km
								0 = 19 08 41.5
31 July		eP'	20 15 23.7	5	1.3		T	

Volume I, No. 8
August 1961

REGISTRATION OF EARTHQUAKES AT WICHITA MOUNTAINS SEISMOLOGICAL OBSERVATORY FORT SILL, OKLAHOMA, U.S.A.

Operated under the Technical Supervision of the
Air Force Technical Applications Center (AFTAC)

by

The Geotechnical Corporation
Garland, Texas

Advanced Research Projects Agency (ARPA)
Department of Defense
United States Government

THE REGISTRATION OF EARTHQUAKES

AT THE

WICHITA MOUNTAINS SEISMOLOGICAL OBSERVATORY

STATION

Station Abbreviation: WMSO

Station Identification on Film Seismograms:

Geographical Location *: 34° 43'05.3" N. Lat.
(Vault No. 6) 98° 35'20.7" W. Long.

GEOCENTRIC LOCATION*: 34° 32'09.8" N. Lat.
(Vault No. 6) 98° 35'20.7" W. Long.

ALTITUDE (Meters)*: 505 Meters (1658)
(Vault No. 6)

GEOLOGY: The station is located on the Carlton (porphyritic) granophyre of the Wichita Mountains of Oklahoma.

NOISE LEVEL - August 1961: The periods of the predominant microseisms at WMSO are 0.5 second and 6 seconds. An amplitude distribution curve for the 0.5 second microseisms may be found on page 2.

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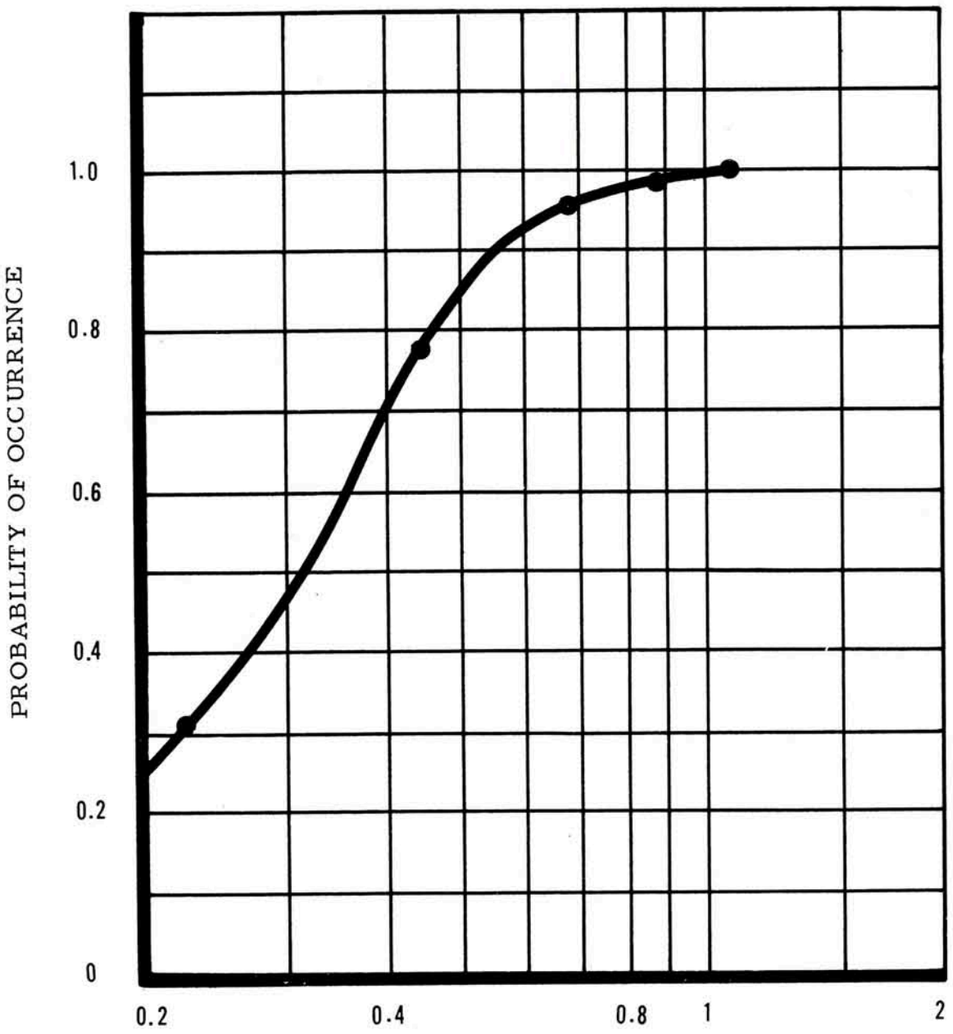
* The coordinates refer to the location of vault no. 6 which houses the 3-component groups of short-period and intermediate band seismometers from which arrival times are determined.



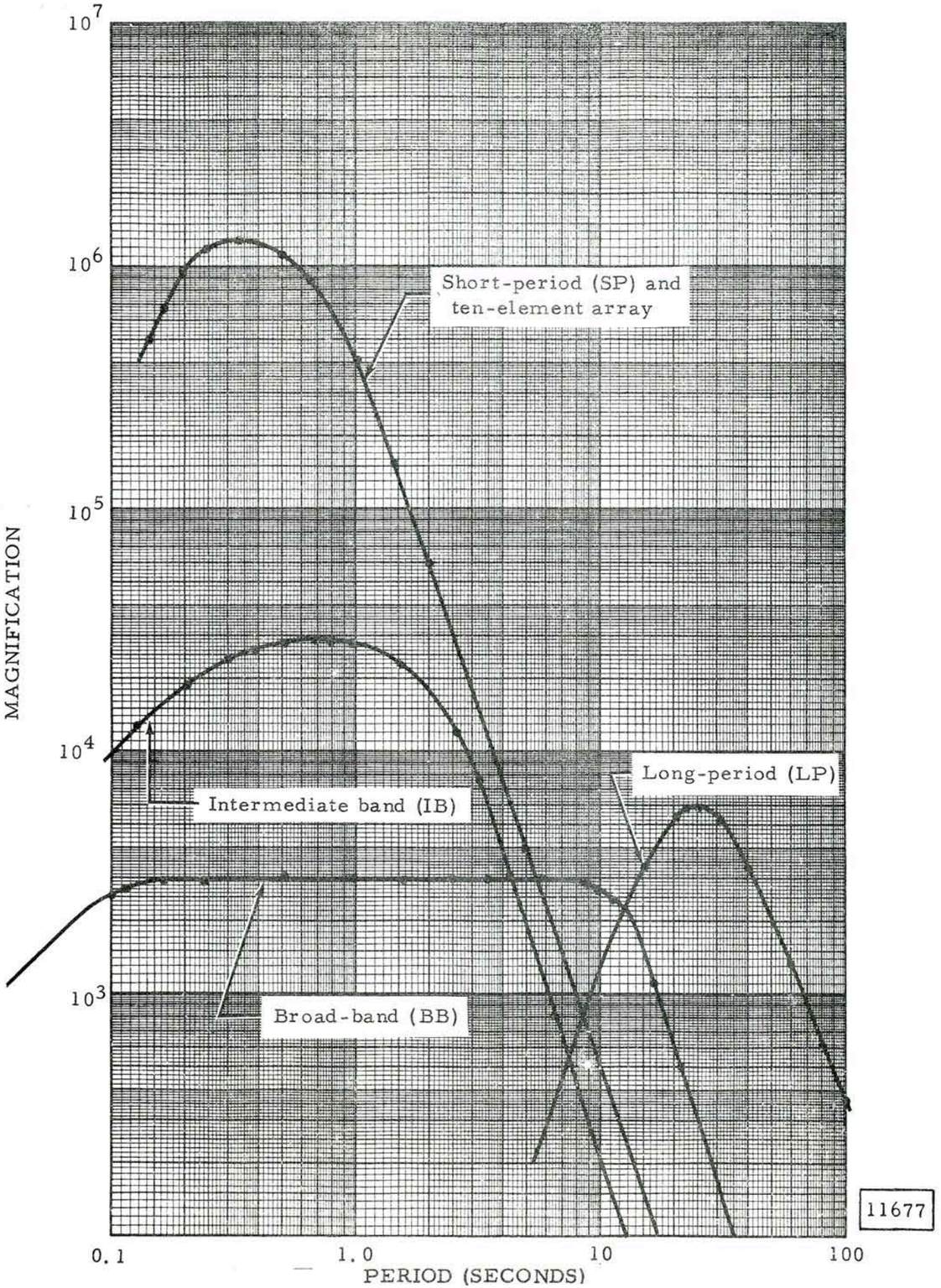
Probability of predominant 0.5-sec microseisms occurring at or less than a given amplitude at Unity magnification

SEISMOGRAPHS

	Ts	λs	Tg	λg	σ^2
SP Vertical Benioff	1.0	1.0	0.2	1.0	0.01
SP Horizontal Benioff	1.0	1.0	0.2	1.0	0.01
IB Vertical Melton	2.5	0.65	0.64	1.5	0.002
IB Horizontal Sprengnether	2.5	0.65	0.64	1.5	0.0005
BB Vertical Press-Ewing	12.5	0.4	0.64	9.0	0.0002
BB Horizontal Sprengnether	12.5	0.4	0.64	9.0	0.0004
LP Vertical Sprengnether	25.0	1.0	30	1.0	0.004
LP Horizontal Sprengnether	25.0	1.0	30	1.0	0.004

SP = Short Period
IB = Intermediate Band
BB = Broad Band
LP = Long Period
Ts = Free Period of seismometer in secs.
λs = Damping constant of seismometer
Tg = Free Period of galvanometer in secs.
λg_2 = Damping constant of galvanometer
σ^2 = Coupling Coefficient

NOTE: Response curves may be found on page 4.



Response characteristics of seismographs

INTERPRETATION OF SYMBOLS

1. Earthquakes Listed

All local (L), near-regional (NR), regional (R), and distant earthquakes (T) are tabulated on the following pages.

2. System

In the column headed "Syst." (system), the seismograph (SP, IB, BB, or LP) and component (Z, N, or E) used to measure arrival time are designated. When no component designation appears, the phase is read from the vertical component. When neither system nor component designation appears, the phase is read from the SP vertical component.

3. Phase

(1) "i" (impetus) preceding a phase designates sudden beginning of the motion. (A designation of "i" in the case of initial P motion indicates a signal-to-noise ratio exceeding about 5/1.)

(2) "e" (emersio) designates gradual beginning.

(3) "i" or "e" alone designates an unidentified phase.

(4) ( ) (parenthesis marks) indicate uncertainty.

4. Time

(1) Date and arrival time are given in Greenwich Civil Time (G.C.T.).

(2) The arrival time is reported as the earliest time on Z, N, or E. Single Z rather than the array summation (Σ) is used for measuring arrival times on the SP seismographs.

5. Ground Motion

(1) In the columns headed "A" and "T" are tabulated earth displacement in millimicrons and period in seconds, respectively. An amplitude of 999 indicates that a signal cannot be measured reliably. A "c" or "d" in the "A" column indicates compression or dilation, respectively, of the ground as indicated by the vertical component instrument.

The value of "A" for P phases is the maximum amplitude in the first ten seconds. All amplitudes are center-to-peak amplitudes.

(2) Trace amplitudes are measured to the nearest 1/2 millimeter at X10 view.

6. Direction

In the column headed "Dir." (direction), the direction of the epicenter as viewed from WMSO is indicated. For teleseisms, direction is obtained only from P and Rayleigh waves and is listed opposite the phase from which it is obtained. For close events, direction can be obtained from P-wave step-out shown on the individual short-period vertical traces.

7 Type

Earthquakes are identified as either:

L	(local) ----------	0 - 1.4°
NR	(near-regional) ----------	1.4- 6°
R	(regional) ----------	6 - 16°
T	(teleseismic) ----------	16 -180°

8 Remarks Column

(1) Epicentral locations, time of origins, depth of foci, and magnitudes are obtained from the U.S. Coast and Geodetic Survey Preliminary Determination of Epicenters cards.

(2) The nature of the surface waves is indicated subjectively.

(3) Epicentral locations and distances reported by the station are accompanied by an indication of the phases used to determine epicentral distance, e.g. Δ (S-P) = 6°, Central Colorado.

(4) Operational notes refer to operational difficulties that affect analysis of data.

Date	Syst.	Phase	Arrival Time G.C.T.	Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h. m. s.					
1 Aug		eP	00 35 17.0	2	0.3		NR	△(S-P) = 1.7°
		e	26.6		0.5			
		eS	38.5	999				
1 Aug		eP	03 25 04.1	13	1.5		T	North Atlantic Ocean
		e	26 30.2		1.0			15.5N 46.6W
	LPE	eS	32 21		16.0			h about 48 km
	LPE	eSur	39 26					0 = 03 16 11.2
								Medium surface waves on LP
1 Aug		eP	05 20 50.7	17	1.0		T	Near coast of southern Chile
		e	21 16.2		1.0			47.1S 73.9W
								h about 84 km
								0 = 05 07 23.5
								P arrived 1 min. late
								USCGS origin may be off 1 min.
1 Aug		eP	05 53 58.1	14	1.2		T	Solomon Islands
		ePP	58 12.7		2.2			9.8S 160.5E
	LP	e	59 45		11.0			h about 50 km
	LP	e(SKP)	06 01 20		15.0			0 = 05 39 53.2
	BB	e	03 55		10.0			Mag 6-1/2 - 6-3/4 (Pas)
	BBE	e(SKS)	04 38		11.0			6-1/2 (Berk)
	LPE	e(S)	05 58		18.0			Strong surface waves on all systems
	LP	e(SP)	07 25		22.0			
	LP	e(SPP)	08 22		19.0			
		ePKKP	10 01.1		0.6			
	LP	e	11 43		27.0			
	LP	e	13 33		30.0			
	LP	eSur	27 53					
		eSur	29 47.0					
1 Aug		eP	06 24 03.3	3	1.0		T	
1 Aug		eP	07 30 17.2	1	0.6		T	

Date	Syst.	Phase	Arrival Time G.C.T.	Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h. m. s.					
1 Aug		eP	07 35 42.2	17	2.0		T	Sandwich Islands region
		eP'	39 34.0		1.1			56.8S 25.1W
		ePP	40 11.2		2.6			h about 44 km
		ePKKP	50 55.4		1.0			0 = 07 21 12.3
								P diffracted at 07 35 42.2
1 Aug		eP'	09 42 51.6	2	1.1		T	Sandwich Islands region
		ePP	43 24.3		1.5			56.6S 24.0W
								h about 61 km
								0 = 09 24 22.4
1 Aug		e(P)	09 49 17.4	1	1.0		T	Sandwich Islands region
		ePP	53 41.0		1.5			57.1S 26.1W
		ePKKP	10 04 21.1		1.0			h about 31 km
								0 = 09 34 40.7
1 Aug		eP	10 22 22.5	2	0.8		T	
1 Aug		eP	12 17 24.8	2	0.9		T	
1 Aug		eP	14 34 26.4	15	0.6		T	Near coast of Mexico
	E	eSur	39 10.6		3.2			19.1N 104.1W
	BB	e	40 52		10.0			h about 58 km
								0 = 14 30 37.3
								Strong surface waves on SP IB & BB
								Medium surface waves on LP
1 Aug		eP	14 52 50.6	2	0.7		T	
1 Aug		eP	15 01 33.2	8	1.5		T	
1 Aug		eP	16 31 33.1	2	0.9		T	South of Fiji Islands
								25.0S 179.6E
								h about 530 km
								0 = 16 18 50.5

Date	Syst.	Phase	Arrival Time G.C.T.	Ground Motion A	T	Dir.	Type	Remarks
1961			h. m. s.					
1 Aug		eP	18 01 27.3	2	0.3		NR	△(S-P) = 1.7°
		eS	48.4	999				
1 Aug		eP	19 39 13.6	2	0.6		T	
1 Aug		eP	19 40 53.5	3	0.6		T	Solomon Islands region
	LP	eSur	20 16 00					10.1S 160.8E h about 59 km 0 = 19 26 51.1 Medium surface waves on LP
1 Aug		eP	20 14 22.2	5	1.3		T	
1 Aug		eP	20 22 29.8	4	1.0		T	
1 Aug		eP	20 40 55.4	1	0.8		T	
1 Aug		eP	20 46 05.8	1	0.3		NR	△(S-P) = 1.9°
	E	eS	29.5		0.4			
1 Aug		eP	21 03 49.4	1	0.2		L	△(S-P) = 0.2°
	N	eS	55.4		0.7			
1 Aug		eP	21 18 50.2	11	1.5		T	North of Ascension Islands 0.6S 16.2W h about 25 km 0 = 21 06 17.8
1 Aug		eP	23 31 33.6	2	0.4		NR	△(S-P) = 1.7°
		e	43.2		0.4			
		eS	55.5	999				
2 Aug		eP	00 34 51.9	2	0.4	ENE	NR	△(S-P) = 3.5°
		e	35 25.0		0.4			
	N	es	34.3		0.5			

Date	Syst.	Phase	Arrival Time G.C.T.	Ground Motion A	T	Dir.	Type	Remarks
1961			h. m. s.					
2 Aug		eP	01 30 24.6	20	1.3		T	South Pacific Ocean
		e	52.0		1.0			53.3S 134.9W
	LPE	eS	41 40		15.0			h about 22 km
	LPE	eSS	47 45		17.0			0 = 01 17 08.1
	LP	e	56 50		20.0			Strong surface waves on LP
	LP	eSur	02 03 00					Medium surface waves on SP
2 Aug		eP	02 46 04.1	1	1.0		T	
2 Aug		eP'	02 50 05.3	1	0.9		T	Sandwich Islands
		e	28.0		0.9			56.7S 24.8W
		e	54 10.8		1.3			h about 25 km
		ePKKP	03 01 14.6		1.0			0 = 02 31 24.8
		e(P'P')	09 33.6		0.8			
2 Aug		eP	04 18 23.2	2	1.2		T	
		e	35.2		1.0			
2 Aug		eP	06 09 17.4	1	0.7		T	
2 Aug		eP	09 14 49.5	1	0.9		T	
2 Aug		eP	12 24 09.4	10	1.0		T	Kurile Islands
		e	30.4		1.0			44.5N 148.7E
	LP	eSur	52 25					h about 74 km 0 = 12 12 03.8 Weak surface waves on LP
2 Aug		eP	13 53 48.4	5	0.8		T	Northern Peru
		e	54 12.0		0.8			4.1S 76.7W
		e	54 26.8		0.8			h about 38 km
		ePcP	55 33.5		0.8			0 = 13 45 44.8

Date	Syst.	Phase	Arrival Time G.C.T.	Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h. m. s.					
2 Aug		eP	14 43 42.2	3	0.6		T	Near coast of Kamchatka
		e	44 06.6		0.6			51.9N 157.8E
								h about 50 km
								0 = 14 32 27.9
2 Aug		eP	16 36 48.0	1	0.2		L	△(S-P) less than 0.1°
	N	eS	53.2		0.7			
2 Aug		eP	17 02 30.6	2	0.8		T	
		e	03 42.0		1.0			
2 Aug	LP	eSur	17 13 50				T	Medium surface waves on LP
2 Aug		eP	17 20 50.0	1	0.6		T	
		e	22 15.8		0.6			
		e	42.0		0.6			
2 Aug		eP'	17 41 59.2	1	0.8		T	Off coast of Java
								12.2S 112.2E
								h about 270 km
								0 = 17 22 59.4
2 Aug		eP	18 34 59.5	2	0.3		L	△(S-P) less than 0.1°
	N	eS	35 02.0		0.6			
2 Aug		eP	19 35 01.0	9	0.4	ENE	NR	△(S-P) = 1.7°
		e	10.6		0.4			
		eS	22.0	999				
2 Aug		eP	20 43 54.7	1	0.4		NR	△(S-P) = 4.5°
	N	eS	44 47.0		0.7			
2 Aug		eP	21 03 10.0	4	1.1		T	
		e	21.2		0.7			
2 Aug		eP	22 20 29.1	2	0.3		R	
	N	eSur	21 42.0		0.4			

Date	Syst.	Phase	Arrival Time G.C.T.	Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h. m. s.					
2 Aug		eP	23 44 23.1	1	0.8		T	
2 Aug		eP	23 51 11.2	1	0.6		T	Fiji Islands region
								20.4S 177.6W
								h about 325 km
								0 = 23 38 31.2
3 Aug		eP'	01 00 31.7	3	1.0		T	Gulf of Aden
		e	02 13.5		0.7			14.3N 52.2E
								h about 75 km
								0 = 00 41 35.7
3 Aug		eP	01 11 08.5	2	0.9		T	Possible PKKP of previous event
3 Aug		eP	02 44 13.7	1	0.8		T	
3 Aug		iP	03 14 28.1	d 131	1.0		T	Puerto Rico
		e(PcP)	17 11.2		0.9			18.2N 66.2W
		e	18 22.2		1.1			h about 141 km
✓	E	eS	19 35.7		1.1			0 = 03 08 02.3
		eScP	20 43.3		1.2			Strong surface waves
	LP	e(SS)	21 56		15.0			on LP
	LP	e	24 30		36.0			Weak surface waves
	N	eScS	43.8		1.8			on BB
	LP	eSur	27 08					LPE inoperative
3 Aug		eP	03 45 48.6	2	0.6		T	
3 Aug		eP	06 17 10.4	4	0.5	SE	T	
3 Aug		eP'	07 10 46.8	10	1.3		T	Ceram
		ePP	12 32.8		1.7			3.5S 130.8E
✓	LP	eSur	49 45					h about 22 km
								0 = 06 51 44.1
								Strong surface waves on LP
								Weak surface waves on BB

Date	Syst.	Phase	Arrival Time G.C.T.	Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h. m. s.					
3 Aug		eP	13 48 13.6	2	1.2		T	
		e	49 00.7		1.2			
		e	50 35.8		0.9			
3 Aug		eP	14 35 17.8	4	1.0		T	Near Islands, Aleutian Islands
		e	28.2		0.8			52.2N 174.0E
		e	36 15.6		0.7			h about 41 km
	LP	eSur	54 15					0 = 14 24 58.2
								Medium surface waves on LP
3 Aug		eP	19 43 30.8	2	0.2		NR	△(S-P) = 3.4°
		e	36.4		0.3			
	E	eS	44 11.1		0.5			
3 Aug		eP	23 26 56.5	3	0.3		NR	△(S-P) = 2°
	E	eS	27 28.2		0.5			
3 Aug		eP	23 43 52.4	3	0.3		NR	△(S-P) = 1.7°
		e	44 01.7		0.4			
		eS	13.7	999				
3 Aug		eP	23 47 49.3	1	0.6		T	Mariana Islands region
		ePP	52 00.0		2.0			12.1N 143.8E
4 Aug	LPE	ePS	00 01 14		19.0			h about 20 km
	LPE	ePPS	02 10		22.0			0 = 23 33 37.7
	LPE	e	04 51		20.0			Strong surface waves on LP
	LPE	e	05 42		19.0			
	LPE	e	12 14		20.0			Weak surface waves on BB
	LPE	e(Sur)	14 26					
	LP	eSur	22 40					
4 Aug		eP	00 20 26.0	2	1.0		T	
4 Aug		eP	01 20 12.2	1	0.3		NR	△(S-P) = 3.1°
	N	eS	56.0		0.5			

Date	Syst.	Phase	Arrival Time G.C.T.	Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h. m. s.					
4 Aug		eP	07 30 13.8	2	1.0		T	Eastern Hokkaido, Japan
								42.7N 144.8E
								h about 18 km
								0 = 07 17 43.8
4 Aug		eP	08 59 44.4	1	1.0		T	
4 Aug		eP	09 12 52.8	3	1.1		T	Samoa Islands region
								15.2S 173.1W
								h about 100 km
								0 = 09 00 15.8
4 Aug		eP	10 46 14.8	4	0.7		T	Andreanof Islands, Aleutian Islands
		e	35.9		1.3			51.4N 177.4W
								h about 20 km
								0 = 10 36 25.1
4 Aug		eP	11 28 38.6	79	1.5		T	Near south coast of
		e	27.4		1.1			Mexico
		e	29 29.5		0.7			15.2N 95.3W
		e	58.2		1.1			h about 24 km
	LPE	eS	32 24		15.0			0 = 11 24 12.8
		e	29.5		1.3			Strong surface waves on LP, BB, and IB
	LP	eSur	34 00					
	LP	eSur	36 50					Weak surface waves on SP
4 Aug		eP	12 00 57.2	1	0.9		T	
4 Aug		eP	13 53 28.3	2	0.3		R	Strong surface waves on SP & IB
		e	54.0	999				
		e	55 00.0	999				Weak surface waves on LP & BB
		eSur	55 35.0	999				
4 Aug		eP	14 23 00.5	1	0.6		T	Weak surface waves on LP & BB
	LP	eSur	48 15					

Date	Syst.	Phase	Arrival Time G.C.T.	Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h. m. s.					
4 Aug		eP	14 38 23.0	2	1.0		T	
		e	45.6		1.0			
4 Aug		eP	16 51 55.8	2	1.0		R	
		e	52 41.0		1.0			
	E	eSur	56 31.0		1.0			
4 Aug		eP	16 59 59.0	14	1.5		R	Western Nevada
	N	eSur	17 04 41.0		2.4			39.0N 117.7W
								h about 12 km
								0 = 16 56 09.1
								Mag = 4-1/2 (Berk)
4 Aug		eP	18 02 37.2	1	0.3		NR	△(S-P) = 1.7°
	E	eS	58.6		0.4			
4 Aug		eP	18 44 04.6	35	1.0		T	North Atlantic Ocean
		e	11.4		0.8			34.8N 38.7W
		e(PcP)	45 38.4		0.9			h about 26 km
	BB	e(PP)	46 13		3.5			0 = 18 35 20.8
	LPE	eS	51 09		18.0			Strong surface waves on
	LPE	eSS	55 00		22.0			LP
	LPE	eSur	57 14					Weak on BB
	LP	e(R)	19 01 00					
4 Aug		eP	23 04 51.4	35	1.6		T	Kurile Islands
		e	59.7		0.7			45.3N 151.1E
		e	05 04.0		0.7			h about 20 km
		ePP	07 50.6		2.2			0 = 22 52 49.2
	BBN	eS	14 46		9.0			Strong surface waves
	LP	eSP	15 35		10.0			on LP
	LPE	e(SS)	20 13		25.0			Weak on BB
	LP	e	23 47		20.0			
	LP	e	32 00		23.0			
	LP	eSur	33 25					

Date	Syst.	Phase	Arrival Time G.C.T.	Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h. m. s.					
4 Aug		eP	23 45 09.3	1	0.7		T	South of Fiji Islands
		epP	46 55.9		1.0			25.4S 179.7W
	N	eSKS	55 03.0		2.0			h about 495 km
								0 = 23 32 24.9
5 Aug		eP	01 07 07.1	1	0.9		T	
5 Aug		eP	01 38 08.9	1	0.6		T	
5 Aug		eP	01 38 51.5	3	1.0		T	Near coast of Vancouver Island
	LP	eSur	49 08					49.4N 129.0W
								h about 15 km
								0 = 01 33 12.2
								Medium surface waves on LP
5 Aug		eP	02 34 00.5	27	1.1		T	Kenai Peninsula, Alaska
		e	14.7		1.1			60.5N 148.6W
		ePcP	35 59.6		0.6			h about 105km
	LPE	eS	40 15		16.0			0 = 02 26 22.4
	LPE	e	41 15		17.0			Strong Surface waves
	LP	e(ScS)	43 36		21.0			on LP
	LPE	e(Sur)	47 53					Medium surface waves
	E	e	50 00.3		2.6			on BB & IB
	LP	eSur	51 39					Weak surface waves on SP
5 Aug		eP	06 21 28.9	6	0.6		T	Off coast of Kamchatka
								50.5N 160.5E
								h about 25 km
								0 = 06 10 16.3
5 Aug		eP	06 26 26.2	1	0.6		T	

Date	Syst.	Phase	Arrival Time G.C.T.	Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h. m. s.					
5 Aug		eP	06 56 43.2	1	1.0		T	Kermedec Islands region
	LP	eSur	07 29 48					28.2S 176.7W
								h about 66 km
								0 = 06 43 05.0
								Medium surface waves
								LP & BB
5 Aug		eP	08 29 28.3	3	0.8		T	Tonga Islands region
		epP	30 27.6		0.9			19.2S 176.0W
								h about 229 km
								0 = 08 16 47.5
5 Aug		iP	09 37 47.6	c 59	1.2		T	Near Chile-Bolivia border
		epP	38 17.7		1.1			18.8S 68.2W
		ePcP	34.1		0.6			h about 113 km
		e	39 05.4		1.0			0 = 09 27 45.5
		ePP	40 03.3		1.3			
		eScP	42 24.8		1.8			
	E	eS	45 52.4		1.4			
	E	e	46 00.3		1.0			
	E	e	43.5		2.8			
	IBE	e	48 17		4.0			
	LPE	eSS	49 48		14.0			
	LPE	e	50 38		17.0			
	LP	e(Sur)	53 28					
	LPE	e(Sur)	55 46					
5 Aug		eP	10 14 52.1	1	1.0		T	
5 Aug		eP	15 17 25.2	3	1.0		T	
5 Aug		eP	15 35 39.0	2	0.8		R	
	E	eSur	39 27.6		0.9			
5 Aug		eP	16 54 00.0	3	0.8		T	
5 Aug		eP	20 27 28.8	3	1.1		T	

Date	Syst.	Phase	Arrival Time G.C.T.	Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h. m. s.					
5 Aug		eP	20 30 29.4	1	0.5		NR	△(S-P) = 4.5°
	E	eS	31 21.5		0.8			
5 Aug		eP	21 19 06.4	1	0.6		T	
6 Aug		eP	03 34 06.4	2	1.1		T	Bonin Islands region
		e	50.0		0.8			26.7N 141.8E
								h about 36 km
								0 = 03 20 39.0
6 Aug		eP	06 10 52.7	2	1.1		T	
6 Aug		eP	10 38 03.0	3	1.2		T	
6 Aug		eP	10 57 03.4	6	1.4		T	
6 Aug		eP	14 50 17.9	3	1.2		T	
6 Aug		eP	19 01 38.8	2	1.0		T	
6 Aug		eP	23 58 36.6	1	1.0		T	
7 Aug		eP	00 22 40.0	1	0.6		T	
7 Aug		eP	01 18 24.5	3	1.2		T	
		e	37.1		1.2			
7 Aug		eP	01 39 03.8	7	1.6		T	
7 Aug		eP	04 14 47.4	4	0.7		T	Hokkaido, Japan
		e	15 09.8		0.8			42.2N 142.1E
								h about 24 km
								0 = 04 02 09.4
7 Aug		eP'	04 41 33.5	18	1.7		T	Celebes
		ePP	43 45.7		2.5			2.7S 121.6E
		eSKP	44 58.0		1.4			h about 18 km
	LP	eSur	05 29 33					0 = 04 22 20.5
								Weak surface waves
								on LP

Date	Syst.	Phase	Arrival Time G.C.T.	Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h. m. s.					
7 Aug		eP'	11 02 22.6	3	0.5		T	Celebes
		ePP	04 20.6		1.5			0.3N 124.0E
		eSKP	05 38.0		1.2			h about 76 km
								0 = 10 43 20.9
7 Aug		eP	12 35 51.8	6	1.2		T	Kermadec Islands region
	LPE	eSur	13 04 25					28.1S 176.5W
	BB	eSur	14 00		8.0			h about 39 km
								0 = 12 22 23.3
								Weak surface waves on LP & BB
7 Aug		eP	12 46 57.8	9	0.8	SSE	T	Weak surface waves on
		e	47 08.6		0.8			BB
		e	53 08.0		0.8			Surface may be separate
	BB	eSur	13 24 20					
7 Aug		eP	16 05 02.3	2	0.9		T	
		e	07 30.4		0.8			
	E	e(Sur)	09 02.0		1.0			
7 Aug		eP	16 15 09.6	4	1.2		T	
7 Aug		eP'	16 30 38.7	6	1.2		T	North of Balleny Islands
	LP	eSur	17 11 00					61.1S 160.4E
								h about 49 km
								0 = 16 11 41.4
								Medium surface waves on LP
7 Aug		eP	16 41 07.7	4	0.9	SE	T	
		e	20.0		0.8			
7 Aug		eP	16 48 22.0	2	0.9		T	
7 Aug		iP	17 06 00.4	c 999		NE	L	△(S-P) less than 0.1°
		eS	02.4	999				

Date	Syst.	Phase	Arrival Time G.C.T.	Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h. m. s.					
7 Aug		eP	17 11 18.2	4	1.0		T	Kermadec Islands region
		e	12 32.9		0.9			27.5S 177.1W
								h about 60 km
								0 = 16 57 50.0
7 Aug		eP	18 02 36.3	1	0.4		NR	△(S-P) = 1.6°
		e	45.6		0.4			
	E	eS	57.2		0.4			
7 Aug		eP	21 01 33.1	2	0.9		T	
7 Aug		eP	22 20 09.3	1	0.3		NR	△(S-P) = 3.2°
		e	16.2		0.4			
		e	39.7		0.5			
	E	eS	46.9		0.3			
7 Aug		eP	23 10 44.2	2	0.8		T	
8 Aug		eP	00 13 35.2	1	0.3		NR	△(S-P) = 3.6°
	N	eS	14 19.0		0.6			
8 Aug		eP	00 32 20.5	6	1.2		T	Kermadec Islands region
	BBE	eSKS	43 00		10.0			28.1S 176.5W
	LPE	eS	46		15.0			h about 51 km
	LPE	e(Sur)	01 01 15					0 = 00 18 52.3
	LP	eSur	07 00					Medium surface waves on BB
								Strong surface waves on LP
8 Aug		eP	01 53 32.4	1	0.8		T	
8 Aug		eP	02 56 03.9	2	1.0		T	
8 Aug		eP	05 46 05.6	7	1.1		T	Andreanof Islands,
		e	18.1		1.2			Aleutian Islands
	LP	eSur	06 05 00					51.9N 176.3W
								h about 57 km
								0 = 05 36 28.9
								Medium surface waves on LP

Date	Syst.	Phase	Arrival Time G.C.T.	Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h. m. s.					
8 Aug		eP	08 00 09.0	9	0.9		T	West of Easter Island
		e	01 04.2		1.2			24.5S 116.2W
								h about 38 km
								0 = 07 49 55.3
8 Aug	LP	eSur	08 08 57				T	Solomon Islands region
								8.1S 156.6E
								h about 61 km
								0 = 07 18 34.9
								Strong Surface waves on LP
								Weak surface waves on BB
8 Aug		eP	09 29 06.3	2	0.6		T	
8 Aug		iP	12 27 39.2	d 875	1.8		T	Fox Islands,
	LP	e(PP)	29 56		17.0			Aleutian Islands
		e	32 44.0		1.1			50.9N 170.7W
	BBE	eS	35 07		9.0			h about 24 km
		e	37 46.2		1.2			0 = 12 18 18.9
	LP	e	40 20		23.0			Strong surface waves on all systems
	LP	eSur	41 35					Mag 6 - 6-1/2 (Pas)
		eP'P'	57 33.2		1.1			5-3/4 - 6 (Pal)
		e	58 16.8		1.1			
		e	56.0		1.0			
8 Aug		eP	13 28 55.7	2	0.9		T	
8 Aug		eP	13 47 09.1	17	1.3		T	Fox Islands,
		e	57 57.8		0.7			Aleutian Islands
								51.3N 170.5W
								h about 39 km
								0 = 13 37 53.0
								Phase at 13 57 57.8
								Possible new event

Date	Syst.	Phase	Arrival Time G.C.T.	Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h. m. s.					
8 Aug		eP	15 52 38.7	3	0.8	NW	T	Fox Islands,
		e	53 25.8		1.1			Aleutian Islands
								51.2N 170.3W
								h about 59 km
								0 = 15 42 25.3
								P arrived 1 min.late
								USCGS may be off 1 min.
8 Aug		eP	18 06 39.6	32	1.5		T	Revillo Gigedo Islands region
		e	52.1		1.2			20.5N 109.0W
		e	07 35.6		1.2			h about 25 km
	LPE	e(S)	09 55		11.0			0 = 18 02 42.6
	LPE	eSur	11 21					Strong surface waves on LP, BB & IB
	LP	eSur	12 32					Weak surface waves on SP
8 Aug		eP	23 29 43.2	1	0.3		NR	△(S-P) = 1.7°
		e	52.9		0.4			
		eS	30 05.2	999				
8 Aug		eP	23 58 32.3	56	1.8		T	Fox Islands,
		e	59 02.3		1.5			Aleutian Islands
9 Aug		e	00 00 13.6		1.5			50.9N 170.5W
								h about 25 km
								0 = 23 49 11.9
9 Aug		eP	00 31 24.8	2	0.9		T	Samoa Islands region
		e	49.1		0.8			15.1S 173.4W
								h about 25 km
								0 = 00 18 41.3
9 Aug		eP	02 04 15.5	2	0.9		T	
9 Aug		eP	02 33 33.3	2	1.0		T	

Date	Syst.	Phase	Arrival Time G.C.T.	Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h. m. s.					
9 Aug		eP	02 48 52.0	1	1.0		T	
9 Aug		eP	03 36 55.3	2	0.9		T	
9 Aug		eP	04 15 04.4	1	1.0		T	Near coast of Northern Honshu, Japan 40.6N 142.8E h about 112km 0 = 04 02 30.8
9 Aug		eP	04 38 10.6	2	0.8		T	Weak surface waves on LP
	LP	eSur	55 00					
9 Aug		eP	07 53 50.0	1	0.6		NR	△(S-P) = 4.1°
	N	eS	54 37.7		0.6			
9 Aug		eP	08 00 55.7	2	0.7		T	
9 Aug		eP	11 17 45.9	2	0.5		R	
		e	18 11.7		0.6			
		e(Sur)	23 11.2		2.0			
9 Aug		eP	16 16 29.8	16	1.5		T	New Hebrides Islands region 19.1S 168.7E h about 69 km 0 = 16 02 36.1 Mag. 5-3/4 (Berk) Strong surface waves on LP
		e	19 28.0		1.4			
	LP	ePP	20 37		25.0			
		e	49.0		1.3			
	LP	eSP	29 38		24.0			
	LP	e	31 10		20.0			
		ePKKP	32 29.8		0.7			
		e	49.8		1.7			
	LP	e(SS)	35 14		24.0			
	LP	e	40 40		20.0			
		eP'P'	47.4		1.0			
	LP	e	43 14		38.0			
	LP	e	45 45		34.0			
	LP	eSur	50 25					

Date	Syst.	Phase	Arrival Time G.C.T.	Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h. m. s.					
9 Aug		eP	17 31 04.2	1	0.5		R	
	E	eSur	32 24.9		0.5			
9 Aug		eP	19 28 11.0	1	0.7		R	
	E	eSur	31 18.7		0.8			
9 Aug		eP	20 15 56.6	3	0.3		NR	△(S-P) = 3.2°
		e	59.7		0.4			
		e	16 02.1		0.3			
	E	eS	34.8		0.5			
9 Aug		iP	20 24 45.2	c 999		SE	NR	△(S-P) = 2.3°
		eS	25 12.8	999				
9 Aug		eP	22 07 32.9	2	0.3		NR	△(S-P) = 1.7°
		e	42.9		0.3			
	E	eS	54.4	999				
9 Aug		eP	23 20 21.6	1	0.4		NR	△(S-P) = 1.7°
	E	eS	42.8	999				
10 Aug		eP	00 10 32.9	2	0.3		NR	△(S-P) = 3.7°
	N	eS	11 16.7		0.4			
10 Aug		eP	01 06 40.0	3	0.8		T	Alaska Peninsula 58.5N 155.1W h about 68 km 0 = 00 58 38.9 Medium surface waves on LP
	LP	eSur	27 00					
10 Aug		eP	01 46 38.4	6	0.9		T	Eastern USSR 54.1N 131.9E h about 25 km 0 = 01 34 19.5
		e	50 25.1		1.0			

Date	Syst.	Phase	Arrival Time G.C.T.	Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h. m. s.					
10 Aug	LP	e	02 21 40		20.0		T	Weak surface waves on LP
	LP	e	25 23		19.0			
	LP	eSur	36 00					
10 Aug		eP	03 12 28.3	1	0.7		T	
10 Aug		eP	06 49 41.6	4	0.8		T	Fiji Islands region 20.8S 178.0W h about 377 km 0 = 06 37 04.7
		epP	51 07.6		1.4			
10 Aug		eP	07 45 02.2	1	1.0		T	Tonga Islands region 20.1S 174.5W h about 100 km 0 = 07 32 05.3
10 Aug		eP	10 21 19.4	1	0.5		T	
		e	47.2		0.6			
10 Aug		eP	10 54 35.5	1	0.7		T	
10 Aug		eP	12 16 27.3	4	1.0		T	Northwest coast of Honshu, Japan 37.2N 136.9E h about 51 km 0 = 12 03 21.8
10 Aug		eP	12 17 49.1	10	1.0		T	Northern Hokkaido, Japan 43.3N 144.9E h about 25 km 0 = 12 05 21.4 Weak surface waves on LP
	LP	eSur	44 50					
10 Aug		eP	16 42 44.2	3	1.0		T	
10 Aug		eP	17 44 00.3	2	0.3		L	△(S-P) = 0.7°
	N	eS	11.4		0.3			

Date	Syst.	Phase	Arrival Time G.C.T.	Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h. m. s.					
10 Aug	LPE	e	17 52 52		14.0		T	Solomon Islands region 9.6S 159.7E h about 44 km 0 = 17 22 31.8 Medium surface waves on LP
	LP	eSur	18 12 07					
10 Aug		eP	18 06 00.6	2	0.4		NR	△(S-P) = 1.7°
	E	eS	21.9		0.5			
10 Aug	LPE	e(Sur)	18 43 33				T	Signal also present on BB system
10 Aug		eP	19 53 24.4	2	0.3		L	△(S-P) = 0.7°
	E	eS	35.0		0.5			
10 Aug		eP	23 27 55.6	1	0.3		NR	△(S-P) = 1.7°
		e	28 05.4		0.4			
	E	eS	17.1		0.4			
11 Aug		eP	00 37 10.8	2	0.2		L	△(S-P) less than 0.1°
		e	12.0		0.2			
		e	13.9	999				
11 Aug		eP	00 54 15.1	9	0.8		T	Kamchatka 56.1N 164.3E h about 27 km 0 = 00 43 29.6 Medium surface waves on LP Weak on BB
		e	24.0		0.9			
		e(PP)	56 43.0		0.9			
	LP	eSur	01 16 20					
11 Aug		eP	03 14 35.6	1	0.7		T	
11 Aug		eP	06 21 54.7	1	1.0		T	Eastern Kyushu, Japan 32.6N 131.4E h about 25 km 0 = 06 08 18.2

Date	Syst.	Phase	Arrival Time G.C.T.	Ground Motion A	T	Dir.	Type	Remarks
1961			h. m. s.					
11 Aug		eP	06 53 25.0	17	1.7		T	S-P & Sur.-P = 31°
	LPE	e(S)	58 29		16.0			Medium surface waves
	LP	e	59 23		15.0			on LP
	LP	eSur	07 08 52					
11 Aug		eP	07 05 33.5	7	0.9		T	Andreanof Islands, Aleutian Islands
								51.7N 176.9W
								h about 65 km
								0= 06 55 54.5
11 Aug		eP	10 38 57.4	2	1.2		T	New Hebrides Islands
		ePKKP	55 14.5		1.0			18.5S 168.2E
	LP	eSur	11 13 32					h about 25 km
								0 = 10 24 58.9
								Strong surface waves
								on LP
11 Aug		eP'	11 23 28.8	6	0.6		T	Northern Celebes
		e	25 12.7		1.3			0.2N 124.E
		e(PKKP)	32 56.6		0.6			h about 143 km
								0 = 11 04 39.1
11 Aug		eP	11 35 44.3	1	0.7		T	
		e	36 48.6		1.1			
11 Aug		iP	16 03 57.6	c 172	1.5		T	Eastern Hokkaido, Japan
		e	04 11.0		2.0			42.9N 145.1E
		e	05 00.0		2.0			h about 71 km
		e	32.2		1.2			0 = 15 51 35.4
	LP	ePP	06 58		16.0			Mag 7 (Pas), (Berk)
	LP	ePPP	09 11		20.0			SPN inoperative
		e	10 26.5		1.3			IBN inoperative
		e	11 02.4		2.4			Strong surface waves
	LP	e	42		19.0			on LP, BB, & IB.
	LP	e	13 28		22.0			Medium surface waves
	LPE	eSKS	14 15		25.0			on SP
	N	e(SKS)	26.8		2.0			

(continued on next page)

Date	Syst.	Phase	Arrival Time G.C.T.	Ground Motion A	T	Dir.	Type	Remarks
1961			h. m. s.					
	N	e	36.4		4.0			
	LPE	eSS	19 48		29.0			
		ePKKP	22 17.5		1.0			
		e	24 03.5		1.2			
	LPE	eSur	27 15					
		e	30 05.2		1.5			
		eP'P'	21.5		1.0			
	LP	eSur	32 24					
		e	33 40.6		3.8			
		eSur	37 50.0					
		eSur	44 00.0					
11 Aug		eP	16 15 08.0	10	1.0		T	
		e	50.0		1.0			
		e	16 18.6		1.2			
11 Aug		eP	20 27 46.8	2	0.3		L	△(S-P) = 1.0°
	N	eS	28 00.3		0.4			
11 Aug		eP	20 55 46.3	1	0.5		NR	△(S-P) = 3.2°
		e	53.2		0.5			
		eS	56 23.9	999				
11 Aug		eP'	22 56 33.4	7	1.5		T	Eastern Celebes
		ePP	58 47.0		2.2			02.8S 122.1E
		eSKP	59 59.7		1.9			h about 20 km
	LP	eSur	23 29 37					0 = 22 37 22.0
								Strong surface waves
								on LP
11 Aug		eP	23 24 19.5	3	1.0		T	Off north coast of
		e	40.0		1.7			Honshu, Japan
								41.5N 141.9E
								h about 122 km
								0 = 23 11 47.9

Date	Syst.	Phase	Arrival Time G.C.T.	Ground Motion A	T	Dir.	Type	Remarks
1961			h. m. s.					
11 Aug		eP	23 46 14.3	11	0.9		T	Eastern Hokkaido, Japan
		e	26.6		1.1			42.8N 145.1E
		ePP	49 34.3		2.0			h about 72 km
								0 = 23 33 51.9
12 Aug		eP	00 35 02.8	2	0.5		NR	△(S-P) = 3.1°
	N	eS	46.7		0.6			
12 Aug		eP	01 00 07.4	1	0.8		T	
12 Aug		eP	02 43 39.9	1	0.7		T	
12 Aug		eP	06 49 31.6	1	0.8		T	
12 Aug		eP	09 41 13.9	1	0.7		T	
12 Aug		eP	13 02 10.1	2	0.8		T	
12 Aug		eP	13 03 24.1	2	0.8		T	Possible phase of preceding event
12 Aug		eP	13 15 52.9	2	0.9		T	Chile-Bolivia border
								21.4S 67.7W
								h about 97 km
								0 = 13 05 30.2
12 Aug		eP	15 36 07.2	11	0.9	SE	R	
	E	eSur	39 26.7		0.9			
12 Aug		eP	16 16 09.8	1	0.6		T	
12 Aug		eP	18 01 43.8	1	0.3		NR	△(S-P) = 1.8°
	E	eS	02 05.9		0.5			
12 Aug		eP	22 16 13.8	2	0.5		NR	△(S-P) = 2.8°
	E	eS	47.0		0.5			
12 Aug		eP	22 33 27.0	5	1.2		T	

Date	Syst.	Phase	Arrival Time G.C.T.	Ground Motion A	T	Dir.	Type	Remarks
1961			h. m. s.					
13 Aug		eP	01 03 05.6	1	0.7		T	
13 Aug		eP	03 39 53.2	6	0.7		T	
		e	44 09.3		0.7			
13 Aug		eP	04 00 10.8	3	0.9		T	
13 Aug		eP	05 43 51.1	8	0.9	SE	T	
13 Aug		eP	06 59 04.1	2	1.0		T	
13 Aug		eP	10 28 18.6	2	0.6		T	Fox Islands, Aleutian Islands
								52.7N 168.4W
								h about 68 km
								0 = 10 19 17.5
13 Aug		eP	13 07 52.8	1	1.0		T	
13 Aug		eP	13 42 19.0	1	0.5		T	
13 Aug		eP	13 43 50.2	4	0.6		T	Windward Islands
		epP	44 21.8		0.9			14.8N 60.3W
	E	e(S)	49 37.4		0.6			h about 158 km
								0 = 13 36 31.9
13 Aug		eP	16 03 15.4	1	0.6		T	Fox Islands, Aleutian Islands
								52.5N 166.6W
								h about 75 km
								0 = 15 54 24.5
13 Aug		eP	18 32 41.7	3	0.9		T	Boliva
		e(pP)	33 17.6		0.9			18.7S 65.6W
								h about 120 km
								0 = 18 22 30.5
13 Aug		eP	21 48 31.3	10	0.7	SE	T	

Date	Syst.	Phase	Arrival Time G.C.T.	Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h. m. s.					
13 Aug		eP	22 46 15.3	1	0.7		T	North Central Italy 45.0N 9.9E h about 20 km 0 = 22 34 18.0
13 Aug		eP	23 30 34.9	1	1.0		T	
13 Aug		eP	23 51 29.1	2	0.9		T	
14 Aug		eP	02 04 40.8	1	0.7		T	Near coast of northern Peru 3.4S 81.3W h about 35 km 0 = 01 56 56.2
		e	50.2		0.7			
		e(PP)	05 53.2		1.7			
14 Aug		eP	03 46 21.5	2	0.7	SE	T	
14 Aug		eP	06 49 38.1	1	0.7		T	Fiji Islands 19.6S 178.1W h about 535 km 0 = 06 37 19.6
14 Aug		eP	12 46 37.2	4	1.0		T	
14 Aug		eP	13 54 20.6	9	0.8		T	Alaska Peninsula 57.6N 158.7W h about 93 km 0 = 13 46 05.1
		e(PP)	55 58.2		0.6			
14 Aug		eSur	15 54 28.0		1.2		T	
14 Aug		eP	16 23 06.6	4	0.4	SW	NR	△(S-P) = 2.7°
	E	eS	38.7		0.9			
14 Aug		eP	18 00 39.6	1	0.4		NR	△(S-P) = 1.7°
	E	eS	01 01.0		0.6			

Date	Syst.	Phase	Arrival Time G.C.T.	Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h. m. s.					
14 Aug		iP	19 04 06.8	d41	0.7		T	Tonga Islands region
		e	23.8		0.8			24.2S 175.7W
		e	05 54.6		1.4			h about 21 km
	LP	ePP	07 57		20.0			0 = 18 50 50.3
	LP	e	11 20		18.0			Mag. 5-1/2 (Berk)
	BBE	eSKS	14 42		7.0			Strong surface waves
	BBE	eSKKS	55		7.0			on LP
	LPE	eS	15 07		19.0			Weak on BB
	LP	eSP	16 32		14.0			
		ePKKP	21 13.7		0.9			
	LP	eSur	34 12					
14 Aug		eP	21 24 31.4	1	0.3		NR	△(S-P) = 1.7°
	E	eS	52.6		0.5			
14 Aug	LP	eSur	22 49 33				T	Off south coast of Honshu, Japan 31.8N 131.2E h about 14 km 0 = 22 04 59.0 Medium surface waves on LP
14 Aug		eP	23 42 40.0	2	1.1		T	New Hebrides Islands region
		e	49.5		0.7			20.3S 169.4E
		e	43 21.4		1.1			h about 97 km
	BB	ePP	46 35		6.0			0 = 23 28 46.5
	LPN	eSKS	53 07		24.0			Mag 6- 6-1/4 (Pas),
		e	34.0		1.0			6 Berk.
	BBE	eSKKS	39		9.0			Strong surface waves
	LPE	ePS	56 01		40.0			on LP & BB
	LPE	ePPS	57 15		25.0			
		ePKKP	58 36.6		1.0			
15 Aug	LPN	eSS	00 02 00		35.0			
	LPN	e(SKKS)	05 52		40.0			
	LPE	e	09 00		29.0			
	LPE	e(Sur)	12 10					
	LP	eSur	18 23					

Date	Syst.	Phase	Arrival Time G.C.T.	Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h. m. s.					
14 Aug		eP	23 54 35.5	2	0.5		NR	△(S-P) = 1.7°
		eS	57.3	999	0.5			
14 Aug		eP	23 58 57.5	8	1.1		T	
15 Aug		e	00 00 32.5		1.0			
		e	06 45.3		1.5			
15 Aug		eP	02 11 34.5	1	0.5		NR	△(S-P) = 2.1°
	E	eS	12 00.2		0.5			
15 Aug		eP	02 23 31.0	2	1.1		T	
15 Aug		eP	02 31 32.0	2	0.9		T	
15 Aug		eP	03 36 41.2	1	0.6		T	
		e	51.1		1.0			
15 Aug		eP	06 32 28.9	1	0.7		T	
15 Aug		eP	06 57 40.3	5	1.3		T	
15 Aug		eP	09 43 07.2	5	1.4		T	
15 Aug		eP	11 53 55.6	2	1.1		T	
15 Aug		eP	12 25 29.1	1	0.6		T	
15 Aug		eP	12 32 48.8	1	0.6		T	Strong surface waves
		e	33 11.2		0.7			on LP & IB
		e	28.7		1.0			Weak on BB & SP
	LP	e(Sur)	44 14					
	E	e(Sur)	29.5		3.0			
15 Aug		eP	14 41 58.7	3	0.6		T	
15 Aug		eP	15 47 11.3	3	0.5		T	Kurile Islands
		e	23.1		0.7			47.6N 155.3E
								h about 34 km
								0 = 15 35 31.0

Date	Syst.	Phase	Arrival Time G.C.T.	Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h. m. s.					
15 Aug		eP	18 05 23.2	1	0.3		NR	△(S-P) = 1.7°
	E	eS	54.5		0.6			
15 Aug		eP	19 02 18.5	2	1.1		T	
15 Aug		eP	19 17 01.4	66	1.4		T	South of Honshu, Japan
		e	16.0		0.9			32.8N 142.4E
		e	31.6		1.2			h about 39 km
		e	18 02.2		1.6			0 = 19 03 55.7
		ePP	20 35.9		1.8			Strong surface waves
		e	55.6		1.5			on LP
	LPE	e	21 01		21.0			Weak surface waves
		e	23 04.1		1.4			on BB
		e	25 18.5		0.6			
	LPE	eSKS	27 25		17.0			
	BBN	eS	28 04		8.0			
	LPE	ePS	29 23		25.0			
	LPE	eSS	34 08		24.0			
		ePKKP	22.0		1.0			
	LPE	e	36 47		24.0			
	LPN	e	40 47		25.0			
		eP'P'	42 34.1		1.4			
	LPN	eSur	43 43					
	LP	eSur	46 35					
15 Aug		eP	21 50 00.3	7	0.8		R	Central Mexico
		e	31.4		0.7			25.2N 103.2W
		e	40.5		0.5			h about 25 km
		e Sur	52 15.7	999				0 = 21 47 33.8
15 Aug		eP	22 52 48.9	3	0.3	NNW	L	△(S-P) = 0.8°
	N	eS	53 00.2		0.3			
16 Aug		eP	01 46 41.2	5	1.1		T	
		e	47 15.6		1.2			
	BB	e	59 05		0.8			
	LPN	eSur	02 05 35					
	LP	eSur	10 00					

Date	Syst.	Phase	Arrival Time G.C.T. h. m. s.	Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961								
16 Aug		eP	03 47 31.2	3	1.4		T	Kermadec Islands
	LPN	eSKS	58 14		16.6			31.8S 177.9W
		ePKKP	04 03 44.6		1.1			h about 70 km
	LP	eSur	20 50					0 = 03 33 52.6
								Medium surface waves on LP
								Weak on BB
16 Aug		eP	04 28 27.0	4	1.0		T	
16 Aug		eP	09 05 56.8	1	0.7		T	
16 Aug		eP	09 10 47.4	1	0.8		T	South of Honshu, Japan
		e	11 12.4		1.5			32.2N 142.1E
								h about 32 km
								0 = 08 57 36.9
16 Aug		eP	09 17 12.0	1	1.0		T	
16 Aug		eP	10 52 37.6	3	1.0		T	
16 Aug		eP	12 20 40.8	2	0.8	NW	T	
		e	46.5		0.8			
16 Aug		eP	12 22 51.6	2	0.6		NR	△(S-P) = 1.7°
		e	23 01.8		0.5			
	E	eS	13.6		0.6			
16 Aug		eP	16 29 13.7	33	2.0		T	South of Ascension Islands
		e(PP)	33 07.4		1.7			13.8S 14.7W
	LP	eSur	57 15					h about 25 km
								0 = 16 15 57.5
								Strong surface waves on LP
16 Aug		eP	18 00 27.2	1	0.2		NR	△(S-P) = 1.7°
		eS	48.6	999				

Date	Syst.	Phase	Arrival Time G.C.T. h. m. s.	Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961								
16 Aug		eP	19 44 56.2	2	0.3		L	△(S-P) = 0.7°
	E	eS	45 06.8		0.4			
16 Aug		eP	21 18 22.4	3	0.9	SW	T	
16 Aug		eP	22 41 47.6	2	0.5		NR	△(S-P) = 3.6°
	N	eS	42 31.2		0.5			
16 Aug		eP	22 51 12.9	2	0.9		T	
16 Aug		eP	23 12 25.7	1	0.3		NR	△(S-P) = 1.8°
	E	eS	48.5		0.8			
17 Aug		eP	00 10 45.4	1	0.3		NR	△(S-P) = 1.6°
	N	eS	11 05.8		0.5			
		e	12 00.2		1.4			
17 Aug		eP	04 51 32.7	1	0.5		T	
		e	45.7		0.6			
17 Aug		eP	05 19 10.0	3	1.1		T	Antarctic Ocean
		e	37.0		1.0			55.3S 124.3W
	LPE	eS	30 19		20.0			h about 05 06 03.5
	LPN	ePS	31 36		17.0			Medium surface waves
	LPE	eSS	36 22		20.0			on LP
	LPE	eSur	45 35					
	LP	eSur	51 35					
17 Aug		eP	06 47 35.4	3	0.7		T	South of Easter Island
		e	46.0		0.7			34.4S 109.0W
		e	55.3		0.8			h about 25 km
	LPE	eS	56 42		25.0			0 = 06 36 23.0
	LPE	e(SS)	07 00 50		25.0			Strong surface waves
	LPE	eSur	04 50					on LP
	LPN	eSur	07 00					Weak on BB

Date	Syst.	Phase	Arrival Time G.C.T.	Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h. m. s.					
17 Aug		eP	17 59 29.8	1	0.9		T	Near coast of southern Peru
		e	18 00 24.6		0.8			17.1S 71.8W
								h about 105km
								0 = 17 49 47.5
17 Aug		eP	19 36 12.7	6	1.4		T	
17 Aug		eP	20 48 55.9	2	0.8		T	
		e	49 27.0		0.7			
17 Aug		eP	21 13 42.6	4	0.2		R	△(S-P) = 6.2°
		e	14 01.0		0.3			
	E	eS	57.3		0.4			
	N	eSur	15 13.0		0.5			
17 Aug		iP	21 28 16.0	c 785	1.6		T	Kurile Islands
		epP	54.2		2.0			46.3N 149.3E
	BB	ePP	31 11		7.0			h about 186 km
	E	eS	37 59.2		4.0			0 = 21 16 30.0
	LPE	eSS	43 04		30.0			Mag 6-3/4 (Pas)
	LPE	eSur	46 29					6-1/2 - 6-3/2 (Berk)
		e(PKKP)	47 27.2		0.8			Strong surface waves
	LP	eSur	48 14					on LP & BB
17 Aug		eP	22 30 03.2	35	0.3		L	△(S-P) = 0.1°
		eS	08.2	999				
18 Aug		eP	02 54 14.8	1	0.4		NR	△(S-P) = 3.2°
	E	e	21.6		0.4			
	E	eS	52.9		0.4			
18 Aug		eP	04 43 17.6	1	0.6		T	
18 Aug		eP	06 00 04.4	3	1.0		T	

Date	Syst.	Phase	Arrival Time G.C.T.	Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h. m. s.					
18 Aug		eP	11 14 03.8	1	0.6		T	Kermadec Islands region
		epP	16 00.9		0.9			24.0S 179.9W
		ePP	18 05.2		1.2			h about 519 km
								0 = 11 01 26.5
18 Aug		eP	15 03 59.4	1	0.6		T	
18 Aug		eP	20 35 43.4	1	0.5		NR	△(S-P) = 3.4°
	N	eS	36 23.8		0.5			
		e	34.4		0.8			
18 Aug		eP	21 28 16.4	1	0.3		NR	△(S-P) = 1.6°
	N	eS	36.5		0.4			
		e	29 30.0		1.4			
18 Aug		eP	21 37 13.2	2	0.3		NR	△(S-P) = 1.7°
		e	22.8		0.3			
		eS	34.4	999				
18 Aug		eP	22 25 33.7	4	1.0		T	
18 Aug		eP	23 39 10.9	1	0.3		NR	△(S-P) = 1.7°
		e	20.0		0.4			
		eS	32.3	999				
19 Aug		eP	00 16 56.8	2	0.5	SSE	NR	△(S-P) = 2.6°
	E	eS	17 28.4		0.5			
	N	eLg	41.8		0.5			
19 Aug		eP	01 14 23.9	2	0.5		T	
19 Aug		eP	02 55 23.8	3	0.8		T	Eastern Hokkaido, Japan
		e	36.6		1.1			43.1N 145.0E
		ePP	58 28.2		1.5			h about 32 km
	LPE	eSur	03 21 12					0 = 02 42 58.2
								Medium surface waves
								on LP

Date	Syst.	Phase	Arrival Time G.C.T.	Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h. m. s.					
19 Aug		eP	03 12 58.2	1	0.6		T	
		e	13 34.7		1.0			
		e	53.6		0.8			
19 Aug		eP	04 34 38.6	2	0.8		T	
		e	35 35.1		0.8			
19 Aug		eP	05 01 06.2	1	0.8		T	
19 Aug		iP	05 18 07.3	d 999			T	Peru-Brazil border 10.7S 71.0W h about 649km 0 = 05 09 49.5 Mag 7 (Pas), 7-3/4 - 8 (Berk) 999 on all systems for first 12 minutes Surface waves present on all systems, but can't time starts due to large amplitudes. Numerous aftershocks recorded but not listed in report.
	BB	e(pP)	20 00	999				
	LPE	eS	24 44	999				
		eScS	26 53.0	999				
19 Aug		eP	05 46 45.7	143	1.5	SE	T	Off west coast of Honshu, Japan 36.0N 136.5E h about 17km 0 = 05 33 30.6 Long period obscured by previous events. Interpretation difficult due to intermingling of events. Mag 7-1/2 (Pas)
		e(PP)	50 29.2		4.2			
		ePKKP	06 03 13.6		1.2			
19 Aug		eP	05 55 22.6	49	0.8	SE	T	
		e	57 39.4		0.8			
		e	06 05 16.0		0.6			

Date	Syst.	Phase	Arrival Time G.C.T.	Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h. m. s.					
19 Aug		eP	06 26 36.8	1	0.7		T	Trinity County, California 40.1N 123.2W h about 41km 0 = 06 22 00.3
19 Aug		eP	06 37 20.6	2	0.9		T	
19 Aug		eP	08 20 32.5	16	1.7		T	Near west coast of Honshu, Japan 35.9N 136.6E h about 25 km 0 = 08 07 18.3
19 Aug		eP	12 17 06.1	1	0.8		T	
19 Aug		eP	12 57 22.5	2	0.8		T	Near east coast of Hokkaido, Japan 43.4N 145.2E h about 20 km 0 = 12 44 57.7
		e	36.0		1.0			
19 Aug		eP	13 18 40.5	5	0.7		T	
19 Aug		eP	14 58 41.6	30	0.9		T	Mona Passage 18.0N 68.8W h about 146 km 0 = 14 52 31.4 Strong surface waves on LP Medium surface waves on BB, IB & SP
		e	59 04.1		1.1			
		epP	16.4		1.2			
	IB	e	15 00 29		2.0			
	N	eS	03 41.7		2.5			
	LPE	e(Sur)	04 18					
		e(ScP)	05 07.5		0.6			
	LP	eSur	07 10					
	LP	e	14 20		15.0			
19 Aug		iP	16 09 48.2	d 32	0.8		T	Peru-Brazil border 11.4S 70.6W h about 645 km 0 = 16 01 25.6
		iPcP	10 48.2		0.6			
		epP	11 36.8		0.9			
		e	12 57.4		0.7			

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Date	Syst.	Phase	Arrival Time G.C.T.	Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h. m. s.					
		eScP	13 49.5		1.0			
		e(PcS)	14 41.7		1.0			
	E	eS	16 33.4		1.0			
	E	eScS	18 33.5		1.2			
19 Aug		eP	16 57 39.0	1	0.7		T	
19 Aug		eP	20 39 05.2	1	0.4		NR	△(S-P) = 4.4°
	E	eS	56.4		0.7			
19 Aug		eP'	20 45 40.4	1	1.0		T	Off west coast of Sumatra
		ePP	48 43.0		2.4			2.1N 96.9E
		e	49 52.6		0.6			h about 25 km
	LP	eSur	21 39 00					0 = 20 26 18.0
								Weak surface waves on LP
19 Aug		eP	21 50 54.6	1	0.7		T	
19 Aug		eP	23 18 01.8	1	0.6		NR	△(S-P) = 4.0°
		e	44.5	1	0.3			
	E	eS	49.4		0.7			
19 Aug		eP	23 29 20.4	1	0.3		NR	△(S-P) = 3.5°
	N	eS	30 04.5		0.5			
20 Aug		eP	00 15 40.4	4	0.7		T	Peru-Brazil border
		e	16 14.0		1.0			10.5S 70.9W
		ePcP	41.7		0.5			h about 659 km
								0 = 00 07 24.5
20 Aug		eP	00 18 30.2	1	0.3		NR	△(S-P) = 1.7°
	N	eS	51.3		0.4			
20 Aug		eP	00 32 00.9	8	1.0	SE	R	
	E	eSur	35 50.0		0.7			

Date	Syst.	Phase	Arrival Time G.C.T.	Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h. m. s.					
20 Aug	LPN	eSKS	01 55 03		18.0		T	New Hebrides Islands
	LPN	ePS	57 43		23.0			17.8S 169.0E
	LPN	ePPS	58 37		23.0			h about 36 km
	LPN	e(SS)	02 03 25		25.0			0 = 01 30 19.2
	LPN	e	10 50		25.0			Medium surface waves on LP.
	LP	eSur	18 35					Weak surface on BB
								LPZ inoperative until 0222Z.
20 Aug		eP	02 39 32.1	1	0.7		T	Tonga Islands
		e	49.9		0.8			16.5S 172.6W
								h about 25 km
								0 = 02 26 46.8
20 Aug		eP	02 56 41.2	1	0.6		T	
20 Aug		eP	04 32 17.3	2	0.8		R	Baja, California
	N	eSur	36 47.4		1.5			31.6N 116.5W
	LP	e	38 14		11.0			h about 25 km
								0 = 04 28 38.2
								Mag 4-3/4 (Pas)
20 Aug		iP	05 16 26.3	c 100	1.0		T	Fiji Islands
		e	51.7		1.1			17.8S 178.8W
		epP	18 37.4		1.3			h about 592 km
	BB	e	19 23		9.0			0 = 05 04 14.3
		e	20 13.8		1.5			Phase reported at
	E	eSKS	26 08.0		1.5			05 36 04.3 possible
	BBE	eSKS	11		6.0			new event
	LPN	eS	48		22.0			
	LP	e	28 00		15.0			
	LPN	ePS	29 07		18.0			
	LPN	ePPS	30 07		20.0			
	LPN	e	31 20		22.0			
	LPN	eSS	33 07		27.0			
		ePKKP	41.4		0.7			
		e	34 23.4		1.4			

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Date	Syst.	Phase	Arrival Time G.C.T.	Ground Motion A	T	Dir.	Type	Remarks
1961			h. m. s.					
	LPN	e	36 25		27.0			
		e(SKP)	04.3		0.8			
		e	24.4		0.7			
	LPE	e	39 16		18.0			
	LPN	eSKKS	55		27.0			
		eP'P'	41 50.1		0.9			
	LPN	e	42 50		24.0			
20 Aug		eP	06 15 53.3	1	0.9		T	
20 Aug		eP	06 36 01.0	1	0.6		T	
20 Aug		eP	09 18 32.2	1	0.4		T	Peru-Brazil border
		ePcP	19 31.8		0.5			11.4S 70.8W
		epP	20 27.6		0.8			h about 678 km
	E	e	27 16.5		0.9			0 = 09 10 11.7
20 Aug		eP	09 21 29.9	6	1.0		R	
	N	eSur	25 15.8		1.0			
20 Aug		eP	13 00 24.2	3	0.8		T	Weak surface waves on LP
	LP	eSur	20 52					
20 Aug		eP	15 19 37.0	5	0.6	SE	R	
	E	eSur	23 09.7		0.8			
20 Aug		eP	21 02 14.2	1	0.7		R	
	E	e(Sur)	05 51.4		0.6			
20 Aug		eP	23 44 00.3	1	0.7		T	
21 Aug		eP	01 39 12.7	4	0.8		T	Jujuy Province, Argentina
		epP	43.7		1.0			23.4S 65.1W
		e	40 21.6		0.8			h about 98 km
	LP	e	48 50		16.0			0 = 01 28 32.0
21 Aug		eP	02 19 13.3	2	0.7		T	Fiji Islands region
		e	18.5		0.7			22.7S 179.2W
								h about 554 km
								0 = 02 06 43.4

Date	Syst.	Phase	Arrival Time G.C.T.	Ground Motion A	T	Dir.	Type	Remarks
1961			h. m. s.					
21 Aug		eP	07 18 06.9	1	0.6		T	
21 Aug		eP	07 35 39.5	6	0.8	SE	T	
		e	50.9		0.8			
21 Aug		eP	08 03 02.2	7	1.0	SW	T	
	LPE	e	06 33		20.0			
	LPE	e	07 27		24.0			
	BBE	e	08 25		11.0			
21 Aug		eP	08 11 02.8	1	0.6		T	
21 Aug		eP	08 22 06.8	3	0.2		L	△(S-P) less than 0.1°
	N	eS	09.5	999				
21 Aug		eP	11 01 28.3	2	0.4		R	
	N	eSur	02 37.3		0.5			
21 Aug		eP	11 29 59.2	2	0.7		T	Fox Islands,
		e	30 21.1		0.7			Aleutian Islands
								50.9N 170.9W
								h about 33 km
								0 = 11 20 39.7
21 Aug		eP	12 00 45.8	2	0.2		NR	△(S-P) = 1.7°
		eS	01 07.5	999				
21 Aug		eP	15 02 45.5	2	1.0		T	
21 Aug		eP	16 19 44.3	207	1.9		T	Tonga Islands
		e	20 04.0		2.0			17.8S 174.4W
	LPN	e	23 37		25.0			h about 74 km
	BBE	eSKS	30 11		6.0			0 = 16 06 55.4
	BBN	eS	28		10.0			Mag 5-3/4 - 6 (Berk)
		ePKKP	37 25.8		0.6			Weak surface on BB
		e	45.4		0.8			
	BB	eSur	49 00					

Date	Syst.	Phase	Arrival Time G.C.T.	Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h. m. s.					
21 Aug		eP	17 13 25.6	21	1.1		T	Off coast of northern Honshu, Japan 40.9N 138.9E h about 49 km 0 = 17 00 37.0
21 Aug		eP	18 53 02.4	1	0.6		T	
		e	55 16.5		0.8			
21 Aug		eP	19 06 54.6	7	0.8	SE	T	
21 Aug		eP	19 15 41.6	8	0.9	SE	T	
21 Aug		eP	19 19 36.5	2	0.8		R	
	E	eSur	20 53.5		0.8			
21 Aug		eP	19 47 36.4	2	0.9		T	
		e	48 41.0		0.9			
		e	49 17.0		0.9			
21 Aug		eP	20 02 03.4	2	0.7		T	
21 Aug		eP	22 21 14.8	2	0.3		NR	△(S-P) = 3.0°
		e	33.3		0.4			
	N	eS	50.2		0.5			
22 Aug		eP	00 09 06.5	2	1.0		T	Weak surface waves on LP
	LP	eSur	22 00					
22 Aug		eP	00 14 07.0	9	1.4		T	
22 Aug		eP	06 24 35.1	2	0.9		T	Near coast of Hokkaido, Japan 43.2N 144.5E h about 25 km 0 = 06 12 07.2
		e	48.6		0.9			
22 Aug		eP	08 15 30.1	2	0.8		T	
		e	43.0		0.8			

Date	Syst.	Phase	Arrival Time G.C.T.	Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h. m. s.					
22 Aug	LPN	ePS	09 26 35		23.0		T	New Hebrides 13.4S 166.7E h about 63 km 0 = 08 59 27.9 Strong surface waves on LP Weak surface on BB
	LP	ePSP	27 35		21.0			
	LPN	eSS	32 15		25.0			
	LPN	eSSS	35 35		35.0			
	LPN	e	39 15		28.0			
	LP	eSur	47 10					
22 Aug		eP	09 27 41.3	2	0.9		T	
		e	29 48.4		0.8			
22 Aug		eP	09 33 18.6	3	0.8		T	
22 Aug		eP	10 41 16.5	1	0.6		T	
22 Aug		eP	11 01 16.8	1	0.3		R	
		e	27.3		0.4			
		e	30.4		0.4			
	N	eSur	02 35.4		0.4			
22 Aug		eP	17 36 58.6	6	1.3		T	
22 Aug		eP	17 59 57.3	1	0.3		NR	△(S-P) = 1.6°
		eS	18 00 18.0	999				
22 Aug		eP	18 15 16.7	3	1.0		T	
		e	55.2		1.0			
22 Aug		eP	18 29 47.0	4	1.2		T	
22 Aug		eP	19 57 15.2	1	0.8		T	
22 Aug		eP	22 31 06.8	2	0.7		T	Fox Islands, Aleutian Islands 52.3N 172.2W h about 53 km 0 = 22 21 47.6

Date	Syst.	Phase	Arrival Time G.C.T.	Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h. m. s.					
22 Aug		eP	23 23 03.9	2	0.9		R	Strong surface waves on
	N	eSur	27 24.0		3.5			SP and IB.
								Weak surface on BB & LP.
23 Aug		eP	00 21 21.2	3	1.0		T	
23 Aug		eP	00 28 07.2	3	1.1		T	
23 Aug		eP	01 04 18.8	3	0.8		R	San Diego County, Calif.
		e	33.8		1.2			32.9N 116.3W
		e	05 21.5		1.5			h about 27 km
		e	54.5		0.8			0 = 01 00 47.1
	LP	eSur	07 30					Mag. 4-3/4 (Pas)
	N	eSur	08 32.0		3.0			Strong surface waves on all systems.
23 Aug		eP	03 51 38.8	2	0.8		T	
23 Aug		eP	04 26 50.0	5	0.8		T	Tadzhik, SSR
		ePP	30 10.0		1.2			38.7N 68.7E
	LPN	ePS	40 20		16.0			h about 25 km
		$ePKKP_1$	42 21.3		0.6			0 =04 12 35.9
		$ePKKP_2$	30.0		1.0			Medium surface waves
		$ePKKP_3$	37.5		1.2			on LP
		$ePKKP_4$	46.2		1.2			Weak surface on BB
	LP	eSur	05 01 20					
	LP	eSur	08 00					
	BB	eSur	20 50					
23 Aug		eP	05 50 48.5	3	1.1		T	
23 Aug		eP	07 25 51.7	1	0.8		T	
23 Aug		eP	08 38 29.6	1	0.8		T	
23 Aug		eP	13 58 49.0	3	1.0		T	
23 Aug		eP	14 18 14.2	1	1.0		T	

Date	Syst.	Phase	Arrival Time G.C.T.	Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h. m. s.					
23 Aug		eP	17 59 39.8	2	0.8		T	
23 Aug		eP	18 02 33.2	1	0.2		NR	Δ(S-P) = 1.7°
		e	35.3		0.2			
		e	43.0		0.4			
	E	eS	55.0		0.4			
23 Aug		eP	18 04 32.1	2	0.4	SE	NR	Δ(S-P) = 1.7°
		e	33.3		0.6			
		e	41.8		0.5			
		eS	53.8	999				
23 Aug		eP	19 26 04.0	4	1.0	SE	T	
23 Aug		eP	19 57 12.4	2	0.2		NR	Δ(S-P) = 3.4°
		e	18.4	2	0.2			
	E	eS	53.0		0.4			
		e	58 04.0		0.7			
23 Aug		eP	21 08 28.5	3	1.0		T	
24 Aug		eP	03 40 18.1	3	0.7	NW	T	
		e	30.5		0.8			
24 Aug		eP	04 19 36.0	2	0.8		T	
24 Aug		eP	05 04 45.5	5	0.9		T	Eastern Hokkaido, Japan
		e	05 58.1		1.0			42.9N 145.3E
	BB	e	22 00		9.0			h about 44 km
	LP	eSur	33 00					0 = 04 52 20.5
								Weak surface waves on LP
24 Aug		eP	06 35 30.3	8	0.8	SE	T	
		e	43.0		0.7			
		e	51.2		0.8			
24 Aug		eP	07 15 38.6	1	0.5		T	

Date	Syst.	Phase	Arrival Time G.C.T.	Ground Motion A	T	Dir.	Type	Remarks
1961			h. m. s.					
24 Aug		eP	10 03 40.5	2	0.7	NW	T	
		e	04 11.1		1.4			
		e	22.0		1.2			
24 Aug		eP	14 20 44.6	3	0.4		NR	△(S-P) = 2.0°
		e	46.9		0.4			
		e	51.6		0.5			
		eS	21 09.4	999				
24 Aug		eP	14 28 03.5	2	0.7		T	
24 Aug		eP	15 36 35.0	1	0.3		NR	△(S-P) = 2.8°
	E	eS	37 08.1		0.4			
		e	08.8		0.6			
24 Aug		eP	18 56 33.3	2	0.9		T	
24 Aug		eP	19 33 08.4	1	0.3	NE	L	△(S-P) = 1.1°
		e	16.3		0.5			
	N	eS	23.4		0.4			
24 Aug		eP	19 39 44.8	1	0.7		T	
24 Aug		eP	20 31 04.0	1	0.5		NR	△(S-P) = 4.5°
		eS	56.7		0.7			
24 Aug		eP	20 56 18.7	1	0.4		NR	△(S-P) = 4.0°
		e	35.3		0.6			
		e	39.5		0.5			
		e	43.4		0.3			
	E	eS	57 05.3		0.5			
	E	e	14.3		0.3			
	E	eSur	26.7		0.4			
24 Aug	LPN	eSKS	21 22 40		20.0		T	Loyalty Islands Region
	LPN	ePS	25 00		25.0			21.3S 173.1E
	LPN	eSS	30 10		31.0			h about 258 km
	LPN	e(SSS)	34 25		36.0			0 = 20 58 36.2
	LP	eSur	44 40					Strong surface waves on LP
								Weak surface on BB

Date	Syst.	Phase	Arrival Time G.C.T.	Ground Motion A	T	Dir.	Type	Remarks
1961			h. m. s.					
24 Aug		eP	22 53 16.7	10	0.9		T	Eastern Hokkaido, Japan
		e	29.5		1.0			43.0N 145.0E
	LPN	eSS	23 08 40		21.0			h about 18 km
	LPN	e	15 05		21.0			0 = 22 40 49.1
	LPN	e	18 40		23.0			Weak surface waves on LP
	LPN	eSur	22 00					
24 Aug		eP	23 30 30.1	1	0.2		NR	△(S-P) = 1.8°
	E	eS	52.3	999				
25 Aug		eP	00 00 10.0	2	0.3		NR	△(S-P) = 1.7°
		e	19.0		0.4			
		eS	31.3	999				
25 Aug		eP	00 13 14.0	1	0.3		NR	△(S-P) = 1.6°
	N	eS	34.8		0.5			
		e	14 27.5		1.5			
25 Aug		eP	00 51 21.6	3	0.7	SE	R	
	N	eSur	55 06.0		0.9			
25 Aug		eP	05 46 51.5	61	1.3		T	Northern Honduras
		e	49 50.7		0.6			15.2N 87.0W
		eSur	50 34.5		1.0			h about 48 km
	LPN	eS	55		20.0			0 = 05 42 01.2
		e	58.7		0.7			Strong surface waves on
		e	51 22.2		1.0			SP & IB.
	LPN	eSur	52 35					Medium surface on LP.
25Aug		eP	06 32 36.2	2	0.8		T	
25 Aug		eP	07 08 02.2	104	1.3		T	Alaska Peninsula
		e	09 07.3		0.8			53.5N 161.2W
		ePcP	32.7		0.9			h about 36 km
	BBE	eS	14 56		10.0			0 = 06 59 30.2
	LPN	eSur	22 03					Medium surface waves on LP.
								Weak surface on BB

Date	Syst.	Phase	Arrival Time G.C.T.	Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h. m. s.					
25 Aug		eP	08 11 09.0	2	0.8		T	
25 Aug		eP	08 11 47.2	2	0.7		T	Possible phase
25 Aug		eP	14 57 22.0	2	0.8		T	
		e	58 20.6		0.6			
25 Aug		eP	20 20 11.8	3	0.9		T	
25 Aug		eP'	21 45 30.8	2	0.8		T	Flores Sea
		eSKP	48 39.6		0.9			8.1S 122.8E
		e	47.6		1.2			h about 191 km
								0 = 21 26 28.1
26 Aug		eP	00 13 37.4	1	0.2		NR	△(S-P) = 3.4°
		e	38.4		0.3	NE		
		e	14 10.8		0.5			
	N	eS	17.4		0.4			
		e	22.0		0.6			
	E	e	58.0		0.5			
26 Aug		eP	00 35 58.1	3	1.2		T	
26 Aug		eP	00 45 36.5	4	0.2		L	△(S-P) = less than 0.1°
		e	37.5		0.3			
		e	39.2		0.6			
		eS	40.2	999				
26 Aug		eP	01 26 27.7	5	0.7		T	Colombia
		e	27 11.2		0.8			7.0N 73.2W
								h about 183 km
								0 = 01 19 39.1
26 Aug		eP	01 58 52.4	2	0.8		T	
		e	59 01.8		0.7			

Date	Syst.	Phase	Arrival Time G.C.T.	Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h. m. s.					
26 Aug		eP	03 30 19.1	6	0.7	SE	T	Very weak LP phases
	LP	e	37 30		20.0			
	LP	e	49 00		16.0			
26 Aug		eP	04 23 27.5	2	1.0		T	
26 Aug		eP	04 28 25.8	5	1.1		T	
26 Aug		eP	06 56 13.1	7	1.0	SE	T	
		e	26.9		1.3			
	LPN	e	07 03 45		30.0			
26 Aug		eP	08 22 46.6	2	1.0		T	
26 Aug		eP	08 41 34.0	1	0.5		R	△(S-P) = 8.5°
	N	eS	43 10.0		0.6			
		eSur	56.5		0.6			
26 Aug		eP	08 57 33.5	2	0.8		T	Kurile Islands
								43.0N 144.6E
								h about 25 km
								0 = 08 45 06.5
26 Aug		eP	14 41 29.7	6	0.9	SSE	T	
		e	46 56.8		1.0			
26 Aug	LP	eSur	18 50 10				T	New Hebrides Islands
								13.9S 166.2E
								h about 66 km
								0 = 18 02 35.9
								Weak surface waves on LP
26 Aug		eP	19 03 26.3	21	1.8		T	Mariana Islands
	LPN	eSur	31 30					18.0N 146.4E
	LP	eSur	36 15					h about 58
								0 = 18 49 47.1
								Medium surface waves on LP

Date	Syst.	Phase	Arrival Time G.C.T.	Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h. m. s.					
26 Aug		eP	21 55 18.8	1	0.8		T	
27 Aug		eP	01 02 25.0	74	1.7	SW	T	△(S-P) = 17°
		e	38.2		1.3			Strong surface on all
	LPE	eS	05 31		15.0			systems
	LPE	eSur	06 50					
	E	eSur	07 20.0		5.5			
	LP	e	08 18		15.0			
27 Aug		eP	02 05 12.3	78	2.0		T	South of Ascension Island
		e	46.2		1.0			15.3N 13.1W
	LPE	ePS	17 45		20.0			h about 49 km
	LPE	eSS	23 03		20.0			0 = 01 51 51.8
	LPN	e	26 57		20.0			Medium surface waves on LP
	LPN	e	29 57		25.0			
	LPE	eSKKKS	33 20		23.0			
	LP	eSur	36 43					
27 Aug		eP	02 45 57.5	7	0.7	SE	T	
27 Aug		eP	03 04 23.4	1	0.8		T	
27 Aug		eP	04 26 36.3	1	1.0		T	
27 Aug		eP	06 55 51.3	4	0.8		T	Fiji Islands
								18.5S 178.2W
								h about 488 km
								0 = 06 43 29.9
27 Aug		eP	07 24 13.4	2	1.2		T	
27 Aug		eP	11 39 40.2	4	1.0		T	
27 Aug		eP	12 15 21.0	2	0.9		T	
27 Aug		eP	15 10 28.0	2	1.1		T	

Date	Syst.	Phase	Arrival Time G.C.T.	Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h. m. s.					
27 Aug		eP	15 38 27.5	3	0.7		T	Easter Island Region
	LPN	eS	46 38		15.0			22.8S 114.4W
	LPN	eSur	55 10					h about 25 km
	LP	eSur	58 10					0 = 15 28 25.0
								Weak surface waves on LP
								& BB
27 Aug		eP	16 15 39.4	1	1.0		T	
27 Aug		eP	16 33 55.4	32	1.3		T	Kurile Islands
		e	34 06.6		2.0			46.6N 154.1E
	LPN	eS	43 37		17.0			h about 31 km
	LPN	eSS	48 10		20.0			0 = 16 22 08.1
	LPE	e	52 25		20.0			Mag. 6-1/2 (Pas)
	LPN	eSur	56 15					5-1/4 - 5-1/2 (Berk)
	LP	eSur	59 55					5-1/4 (Pal)
								Strong surface waves on LP
27 Aug		eP	17 01 25.2	17	1.1		T	Mariana Islands
		e	40.8		1.5			18.3N 146.6E
		e	54.4		1.6			h about 27 km
		ePP	05 34.9		1.7			0 = 16 47 44.8
	E	eSKS	12 00.0		1.4			Mag. 6-1/4 - 6-1/2 (Pas)
	E	eS	51.7		4.5			5-1/2 (Berk)
		e	17 38.6		1.0			Strong surface waves on LP
		ePKKP	47.9		1.1			Medium surface on BB
		e	18 18.0		1.3			
	LPN	eSur	29 10					
	LP	eSur	34 10					
27 Aug		eP'	17 20 57.0	2	0.5		T	Halmahera
		e	22 08.0		1.3			2.2N 128.6E
		ePP	35.0		1.7			h about 263 km
		ePKKP	30 51.6		0.7			0 = 17 02 27.2
27 Aug		eP	18 11 42.7	1	0.9		T	Mariana Islands
								17.9N 146.4E
								h about 74 km
								0 = 17 58 00.8

Date	Syst.	Phase	Arrival Time G.C.T.	Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h. m. s.					
27 Aug		eP	21 08 04.0	7	0.9		T	Kurile Islands
		e	11 28.6		1.1			46.8N 153.9E
	LPN	eS	17 48		15.0			h about 25 km
	LP	eSur	31 40					0 = 20 56 15.6
								Very weak surface waves on LP
27 Aug		eP	22 21 51.0	8	1.2		T	Near west coast of Crete
		e	55.5		0.9			35.9N 23.7E
		e	22 05.5		1.0			h about 69 km
		e	24 08.2		1.0			0 = 22 08 49.8
	LP	eSur	52 25					Weak surface waves on LP
28 Aug		eP	02 23 50.9	2	1.0		T	
28 Aug		eP	03 27 42.8	1	0.6		T	
		e	28 50.8		1.5			
28 Aug		iP	06 37 45.8	c 166	0.8		T	Peru-Bolivia border
	BB	e	38 29		5.0			15.1S 70.2W
		eScP	42 24.8		1.0			h about 185 km
	N	eS	45 21.5		1.2			0 = 06 28 19.4
	N	e	28.5		0.9			Weak surface waves on LP
	LPN	e	46 43		13.0			
	N	eScS	47 15.9		1.1			
	LPN	eSS	48 45		20.0			
	LPE	eSur	50 40					
	LP	eSur	55 15					
		eP'P'	07 07 38.0		0.7			
		e	47.0		1.0			
28 Aug		eP	07 10 11.8	2	0.5	SE	R	
		e	21.9		0.5			
		e	30.0		0.4			
		e	37.4		0.6			
		e	42.0		0.5			
		e	47.5		0.5			
		e	58.6		0.5			
	E	eSur	13 26.8		0.6			

Date	Syst.	Phase	Arrival Time G.C.T.	Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h. m. s.					
28 Aug		eP	07 53 59.8	1	0.6		T	Santa Cruz Islands
		e	55 07.8		1.2			12.7S 169.6E
		epP	56 18.8		0.8			h about 662 km
		e	58 10.4		0.8			0 = 07 41 24.5
		ePKKP	08 10 26.2		0.6			
		e	56.4		1.0			
28 Aug		eP	08 13 22.4	4	0.8	NW	T	
28 Aug		eP	09 21 21.1	13	1.1		T	Kamchatka
		e	50.7		0.9			53.6N 159.1E
	LP	eSur	43 25					h about 25 km
								0 = 09 10 13.0
								Weak surface waves on LP
28 Aug		iP	09 56 26.7	d 23	0.8		T	Fiji Islands
		e(pP)	58 31.3		1.0			18.6S 178.0W
	E	e	10 06 49.7		1.5			h about 574 km
		ePKKP	13 39.4		0.7			0 = 09 44 13.5
28 Aug		eP	10 26 11.0	2	0.8		R	
		e	39.0		0.8	SE		
		e	29 33.2		1.0			
	E	eSur	48.6		0.8			
28 Aug		eP	10 50 00.8	2	0.7		T	
28 Aug		eP	12 25 34.4	5	1.1		T	Kurile Islands
								46.7N 153.9E
								h about 19 km
								0 = 12 13 45.3
28 Aug		eP	13 19 49.8	1	0.7		T	Kurile Islands
		e	20 00.6		0.8			46.7N 154.0E
								h about 30 km
								0 = 13 08 02.3
28 Aug		eP	15 25 41.5	2	0.8		T	

Date	Syst.	Phase	Arrival Time G.C.T.	Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h. m. s.					
28 Aug		eP	17 51 32.1	2	0.9		T	
		e	39.8		1.1			
28 Aug		eP	18 13 43.6	3	1.1		T	Kurile Islands
		e	55.2		0.7			46.8N 154.0E
	LP	eSur	46 30					h about 32 km
								0 = 18 01 56.6
								Weak surface waves on LP
28 Aug		eP	19 23 42.2	3	0.8		T	
		e	24 09.0		0.8			
28 Aug		eP	20 35 58.6	57	1.7		T	Easter Island region
	LPN	eS	44 13		17.0			22.9S 113.4W
	LPN	eSS	48 10		18.0			h about 56 km
	LPE	eSur	52 30					0 = 20 26 04.2
	LP	eSur	54 05					Strong surface waves on LP
	LP	eSur	55 27.					Medium surface on BB
		eP'P'	21 05 40.0		1.5			
28 Aug		eP	21 30 51.0	1	0.2		NR	△(S-P) = 1.7°
		e	52.0		0.2			
	E	eS	31 12.0		0.5			
28 Aug		eP	21 36 30.4	187	2.0		T	Near coast of Peru
		e	56.4		1.8			14.0S 74.4W
		ePcP	37 35.2		0.8		h	h about 73 km
		e	38 00.6		1.0			0 = 21 27 12.1
	E	eS	44 00.0		3.0			Medium surface waves
	LPN	e	37		15.0		o	on LP
	LP	e	45 29		15.0			
	LPN	e	46 54		15.0			
	LP	eSur	49 10					
28 Aug		eP	22 07 26.0	9	1.4		T	Possible P'P' of Peru event
28 Aug		eP	23 23 15.4	2	0.9		T	

Date	Syst.	Phase	Arrival Time G.C.T.	Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h. m. s.					
28 Aug		eP	23 40 30.6	1	0.2		NR	△(S-P) = 1.7°
		e	40.2		0.3			
	E	eS	52.4		0.5			
29 Aug		eP	00 18 01.6	6	0.6	SE	T	
		e	22.3		0.6			
		e	28.4		1.1			
29 Aug		eP	01 25 20.5	1	0.7		T	
29 Aug		eP	02 42 40.0	6	1.3		T	△(S-P) = 32.5°
		e	53.0		1.0			
	LPN	e(S)	47 55		14.0			
29 Aug		eP	03 57 07.0	1	0.4		NR	△(S-P) = 5.8°
	E	e(S)	58 17.7		0.8			
	E	eSur	38.5		0.7			
29 Aug		eP	04 07 16.4	6	0.7	SE	T	
29 Aug		eP	06 08 00.5	2	0.9		T	Kurile Islands
		e	12.5		1.0			42.7N 145.0E
	LP	eSur	37 00					h about 25 km
								0 = 05 55 33.0
								Weak surface waves on LP
29 Aug		eP	07 47 26.4	3	0.7		T	
		e	36.0		0.6	SE		
		e	43.8		0.6			
29 Aug		eP	11 58 55.1	1	0.5		T	Jujuy Province Argentina
								22.8S 67.1W
								h about 82 km
								0 = 11 48 22.1
29 Aug		eP	12 22 15.0	16	0.6	SSE	T	
		e	30.4		0.6			

Date	Syst.	Phase	Arrival Time G.C.T.	Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h. m. s.					
29 Aug		eP	13 10 57.4	1	0.8		T	
29 Aug		eP	13 53 45.6	1	0.6		T	
29 Aug		eP	14 20 18.6	2	0.7		T	
		e	37.6		1.5			
		e	21 08.6		0.9			
29 Aug		eP	15 00 30.0	99	1.5		T	Fox Islands, Aleutian Islands
		e	02 54.5		1.1			52.2N 170.8W
	E	eS	08 01.0		2.8			h about 41 km
	LPN	eSur	15 20					0 = 14 51 14.2
	LP	eSur	17 14					Strong surface waves on LP
								Medium surface waves on BB & IB
								Mag. 5 - 5-1/2 (Pal)
29 Aug		eP	15 26 17.2	1	0.5		T	
		e	24.8		0.5			
29 Aug		eP	17 19 05.6	2	0.6		T	
29 Aug		eP	17 51 56.6	8	1.1		T	
29 Aug		eP	20 14 07.3	1	0.3		NR	△(S-P) = 1.5°
	E	eS	26.9		0.4			
29 Aug		eP	22 45 16.8	1	0.6		T	Fox Islands, Aleutian Islands
								52.9N 166.7W
								h about 66 km
								0 = 22 36 23.1
30 Aug		eP	02 34 37.2	16	0.6		T	Fox Islands, Aleutian Islands
								53.7N 166.3W
								h about 67 km
								0 = 02 25 45.4

Date	Syst.	Phase	Arrival Time G.C.T.	Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h. m. s.					
30 Aug		eP	03 45 47.0	4	1.0		T	North Atlantic Ocean
		e	46 09.7		1.5			7.0N 33.2W
		e	30.0		1.5			h about 69 km
	LPN	eS	54 30		16.0			0 = 03 35 07.7
	LPN	eSS	58 48		20.0			Mag. 4-1/2 - 4-3/4 (Pal)
	LPN	eSur	04 01 53					Strong surface waves on LP
	LP	eSur	04 35					Weak surface waves on BB
		eP'P'	14 44.2		1.0			
30 Aug		iP	03 53 27.2	c 40	0.6		T	Ecuador-Peru border
		ePcP	55 17.2		0.7			3.5S 77.7W
	E	eS	04 00 02.3		2.2			h about 25 km
								0 = 03 45 25.7
30 Aug		eP	04 10 57.2	3	0.6		T	
30 Aug		eP	04 44 20.6	10	0.6	SE	T	
30 Aug		eP	11 02 06.6	1	0.6		R	
		e	14.2		0.5			
		e	55.0		0.5			
	N	eSur	03 42.0		0.6			
30 Aug		eP	12 59 51.0	1	0.6		T	
30 Aug		eP	15 57 59.8	1	0.3		NR	△(S-P) = 1.7°
		e	58 09.4		0.4			
	E	eS	21.2		0.4			
30 Aug		eP	16 52 05.2	2	0.8		T	
30 Aug		eP	17 51 56.4	5	0.8		T	Peru-Bolivia border
		ePcP	52 49.2		0.6			15.6S 69.4W
								h about 250 km
								0 = 17 42 30.3
30 Aug		iP	19 54 03.4	c 999			L	△(S-P) less than 0.1°
		eS	06.0	999				

Date	Syst.	Phase	Arrival Time G.C.T.	Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h. m. s.					
30 Aug		eP	22 50 58.1	3	1.1		T	
30 Aug		eP	23 05 05.0	1	0.4		NR	△(S-P) = 3.8°
		eS	50.0		0.5			
31 Aug		eP	00 36 14.6	3	0.9		T	Kermadec Islands
	LPN	eSKS	46 53		15.0			28.1S 176.7W
	LPN	eS	47 40		16.0			h about 56 km
		ePKKP	53 00.1		0.8			0 = 00 22 47.3
		e	28.1		1.0			Medium surface waves on LP
	LPE	eSS	54 17		20.0			Phase at 00 53 28.1
	LPE	eSur	01 04 30					possible new event
	LP	eSur	08 00					
31 Aug		iP	01 56 55.5	d999			T	Peru-Brazil border
		epP	58 46.6	999				10.6S 70.9W
		iS	02 03 35.6	999				h about 626 km
								0 = 01 48 37.5
								Mag. 7 - 7-1/4 (Pas)
								6-1/2 (Berk)
								Strong surface on all systems. Later phases obscured by new event.
31 Aug		eP	02 05 23.4	999			T	Peru-Brazil border
		eS	11 59.6	999				10.4S 70.7W
								h about 629 km
								0 = 01 57 08.0
								Mag 7-1/2 (Pas)
								7 (Berk)
								Strong surface on all systems.
								Numerous aftershocks recorded but not listed.

Date	Syst.	Phase	Arrival Time G.C.T.	Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h. m. s.					
31 Aug		eP	03 24 40.8	2	0.6		T	
31 Aug		eP	04 09 27.7	3	1.0		T	Samoa Islands region
								15.3S 172.8W
								h about 25 km
								0 = 03 56 44.4
31 Aug		eP	04 58 22.5	1	0.2		R	△(S-P) = 6.5°
		e	35.7		0.3			
		e	41.9		0.5			
		e	46.6		0.4	(SW)		
	E	e(S)	59 31.5		0.5			
	E	e	59.4		0.5			
	E	eSur	05 00 05.6		0.6			
31 Aug		eP	08 33 30.5	2	0.5	SE	T	
		e	35.5		0.6			
		e	50.5		1.0			
31 Aug		eP	08 34 24.5	4	0.7	SE	T	
		e	33.7		1.0			
31 Aug		eP	13 30 09.1	1	0.7		T	
31 Aug		eP	15 07 33.4	15	1.0		T	Near Coast of Peru
		ePcP	09 00.0		0.8			9.5S 79.0W
								h about 100 km
								0 = 14 59 00.9
31 Aug		eP	21 13 49.9	2	0.9		T	
31 Aug		eP'	23 43 21.0	1	0.6		T	Western New Guinea
								3.2S 139.4E
								h about 108 km
								0 = 23 24 42.6

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September 1961

REGISTRATION OF EARTHQUAKES AT WICHITA MOUNTAINS SEISMOLOGICAL OBSERVATORY FORT SILL, OKLAHOMA, U.S.A.

Operated under the Technical Supervision of the
Air Force Technical Applications Center (AFTAC)

by

The Geotechnical Corporation
Garland, Texas

Advanced Research Projects Agency (ARPA)
Department of Defense
United States Government

THE REGISTRATION OF EARTHQUAKES

AT THE

WICHITA MOUNTAINS SEISMOLOGICAL OBSERVATORY

STATION

Station Abbreviation:	WMSO
Station Identification on Film Seismograms:	a
Geographical Location *:	34° 43' 05.3" N. Lat.
(Vault No. 6)	98° 35' 20.7" W. Long.
GEOCENTRIC LOCATION*:	34° 32' 09.8" N. Lat.
(Vault No. 6)	98° 35' 20.7" W. Long.
ALTITUDE (Meters)*:	505 Meters (1658)
(Vault No. 6)	

GEOLOGY: The station is located on the Carlton (porphyritic) granophyre of the Wichita Mountains of Oklahoma.

NOISE LEVEL - September 1961: The periods of the predominant microseisms at WMSO are 0.5 second and 6 seconds. An amplitude distribution curve for the 0.5 second microseisms may be found on page 2.

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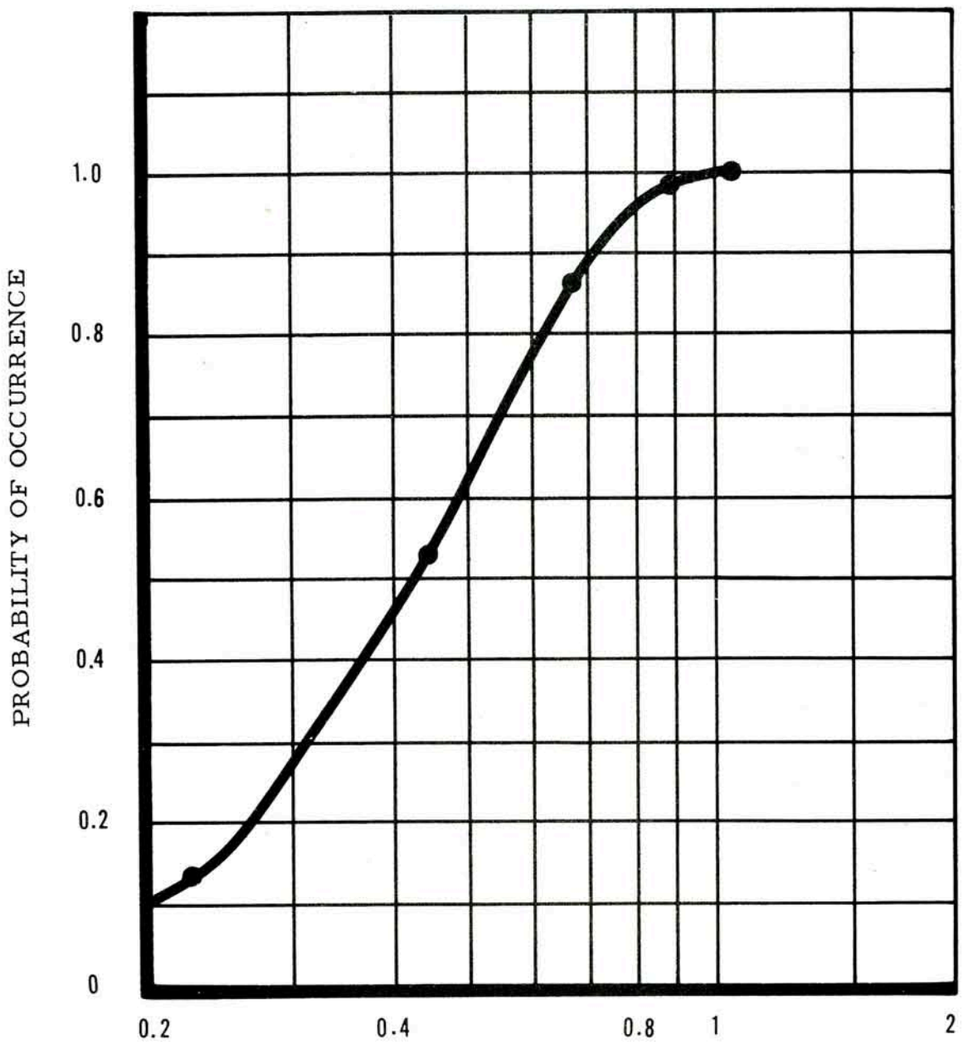
* The coordinates refer to the location of vault no. 6 which houses the 3-component groups of short-period and intermediate band seismometers from which arrival times are determined.



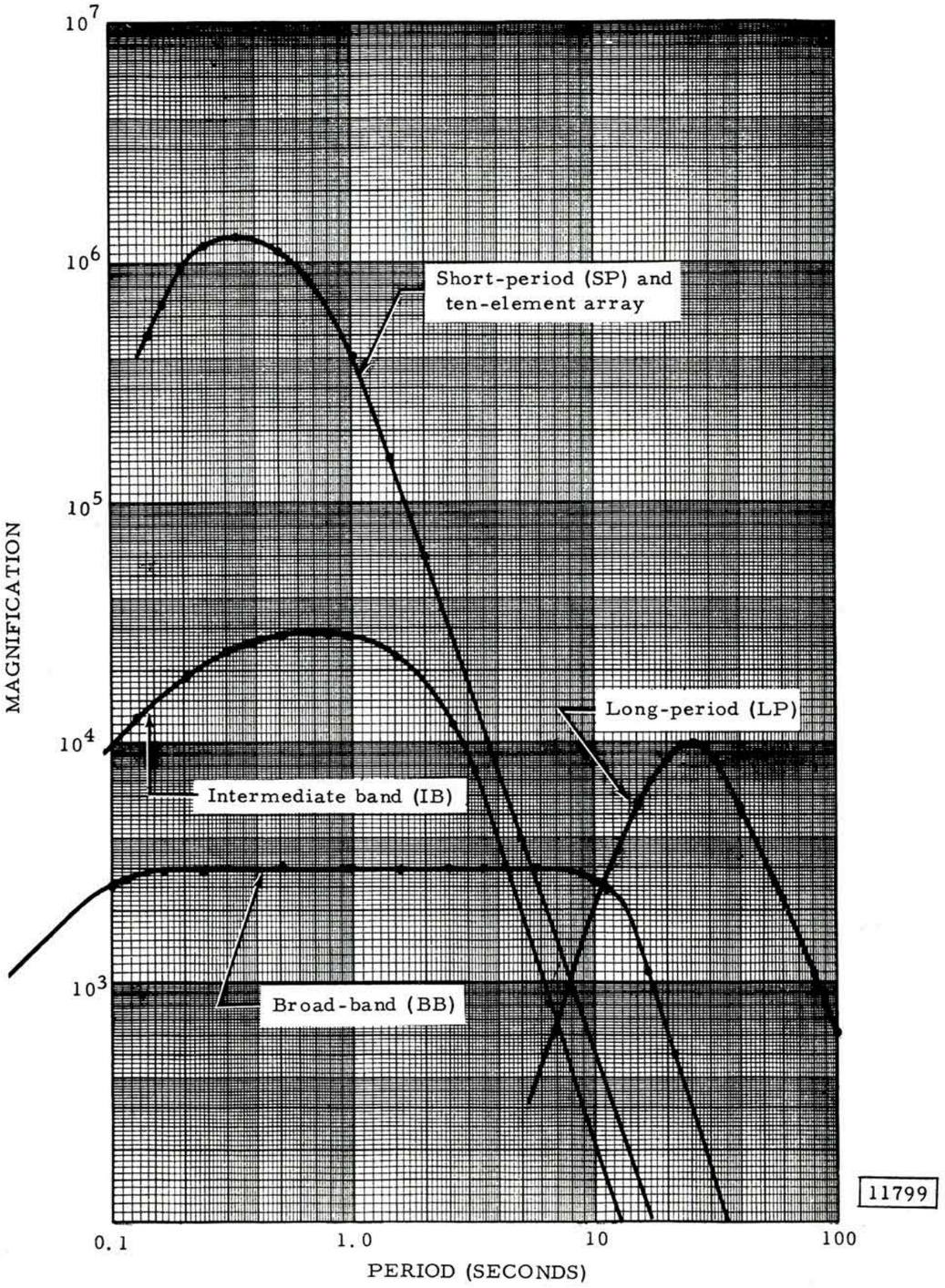
Probability of predominant 0.5-sec microseisms occurring at or less than a given amplitude at Unity magnification

SEISMOGRAPHS

	Ts	λs	Tg	λg	σ^2
SP Vertical Benioff	1.0	1.0	0.2	1.0	0.01
SP Horizontal Benioff	1.0	1.0	0.2	1.0	0.01
IB Vertical Melton	2.5	0.65	0.64	1.5	0.002
IB Horizontal Sprengnether	2.5	0.65	0.64	1.5	0.0005
BB Vertical Press-Ewing	12.5	0.4	0.64	9.0	0.0002
BB Horizontal Sprengnether	12.5	0.4	0.64	9.0	0.0004
LP Vertical Sprengnether	25.0	1.0	30	1.0	0.004
LP Horizontal Sprengnether	25.0	1.0	30	1.0	0.004

SP = Short Period
IB = Intermediate Band
BB = Broad Band
LP = Long Period
Ts = Free Period of seismometer in secs.
λs = Damping constant of seismometer
Tg = Free Period of galvanometer in secs.
λg_2 = Damping constant of galvanometer
σ^2 = Coupling Coefficient

NOTE: Response curves may be found on page 4.



Response characteristics of seismographs

INTERPRETATION OF SYMBOLS

1. Earthquakes Listed

All local (L), near-regional (NR), regional (R), and distant earthquakes (T) are tabulated on the following pages.

2. System

In the column headed "Syst." (system), the seismograph (SP, IB, BB, or LP) and component (Z, N, or E) used to measure arrival time are designated. When no component designation appears, the phase is read from the vertical component. When neither system nor component designation appears, the phase is read from the SP vertical component.

3. Phase

(1) "i" (impetus) preceding a phase designates sudden beginning of the motion. (A designation of "i" in the case of initial P motion indicates a signal-to-noise ratio exceeding about 5/1).

(2) "e" (emersio) designates gradual beginning.

(3) "i" or "e" alone designates an unidentified phase.

(4) ( ) (parenthesis marks) indicate uncertainty.

4. Time

(1) Date and arrival time are given in Greenwich Civil Time (G. C. T.)

(2) The arrival time is reported as the earliest time on Z, N, or E. Single Z rather than the array summation ($\sum$) is used for measuring arrival times on the SP seismographs.

5. Ground Motion

(1) In the columns headed "A" and "T" are tabulated earth displacement in millimicrons and period in seconds, respectively. An amplitude of 999 indicates that a signal cannot be measured reliably. A "c" or "d" in the "A" column indicates compression or dilation, respectively, of the ground as indicated by the vertical component instrument.

The value of "A" for P phases is the maximum amplitude in the first ten seconds. All amplitudes are center-to-peak amplitudes.

(2) Trace amplitudes are measured to the nearest 1/2 millimeter at X10 view.

6. Direction

In the column headed "Dir." (direction), the direction of the epicenter as viewed from WMSO is indicated. For teleseisms, direction is obtained only from P and Rayleigh waves and is listed opposite the phase from which it is obtained. For close events, direction may be obtained from P-wave step-out shown on the individual short-period vertical traces.

7. Type

Earthquakes are identified as either:

L	(local)	0^o -	1.4^o
NR	(near-regional)	1.4^o -	6^o
R	(regional)	6^o -	16^o
T	(teleseismic)	16^o -	180^o

8. Remarks Column

(1) Epicentral locations, time of origins, depth of foci, and magnitudes are obtained from the U.S. Coast and Geodetic Survey Preliminary Determination of Epicenters cards.

(2) The nature of the surface waves is indicated subjectively.

(3) Epicentral locations and distances reported by the station are accompanied by an indication of the phases used to determine epicentral distance, e.g. $\triangle$ (S-P) = 6^o, Central Colorado.

(4) Operational notes refer to operational difficulties that affect analysis of data.

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
01 Sept		eP	00	07	48.8	1	0.5		NR	$\triangle$(S-P) = 3.2^o
		e			51.9		0.4			
		e			55.9		0.3			
	E	eS		08	26.4		0.4			
		eSur			39.4	999				
01 Sept		eP	00	13	25.3	1	0.3		NR	$\triangle$(S-P) = 1.6^o
	E	eS			46.1		0.5			
		e		14	38.0		1.5			
01 Sept		eP	00	23	56.0	69	1.6		T	Sandwich Islands region
		e		24	34.6		1.2			59.3 S 27.3 W
		e			50.9		1.2			h about 131 km
		e(P')		27	35.2		1.0			0 = 00 09 34.6
		e(P')			58.9		0.8			Mag. 7-1/2 (Pas),
		e		28	16.9		3.0			7 (Berk)
	LP	ePP			33		20.0			Very strong surface
	BB	ePPP		30	50		9.0			on LP and BB.
		eSKP		31	01.9		3.3			Weak surface on SP
	BB	eSKP			29		12.0			and IB.
	LPE	eSKS		34	25		25.0			Initial arrival is
	LPE	eSKKS		35	35		27.0			P diffracted.
		e		36	11.4		1.3			
	LPE	ePS		38	12	999				
		$ePKKP_1$			56.8		0.9			
		$ePKKP_2$		39	06.0		1.0			
		e		41	41.4		1.4			
	LPE	ePKKS		42	00		28.0			
	LP	e(SS)		44	45	999				
		e(SKKS)		46	26.6		3.0			
		e(P'P')		47	06.9		1.3			
		e			12.4		4.5			
		e(P'P')			20.6		1.5			
	LP	eSur	01	03	00					
01 Sept		eP	01	06	38.7	1	0.7		T	
		e		08	09.4		1.4			
01 Sept		eP	01	39	11.9	2	1.0		T	

DATE	Syst.	Phase	Arrival Time G.C.T.	Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h. m. s.					
01 Sept		eP	03 20 54.3	26	0.9		T	Honduras
	E	eSur	24 47.8					15.0 N 87.4 W
								h about 161 km
								0 = 03 16 12.9
01 Sept		eP	04 43 19.3	1	0.8		T	
01 Sept		eP	04 47 22.0	19	0.9		T	Chiapas, Mexico
		e	48 00.1		0.8			16.4 N 93.8 W
		eSur	50 42.8	999				h about 155 km
								0 = 04 43 13.4
								Weak surface waves on BB
01 Sept		eP	07 45 23.5	1	0.9		T	Weak surface on LP
	LPN	eSur	08 16 40					
01 Sept		eP	09 50 14.4	10	0.7	SE	T	
		e	45.5		1.0			
01 Sept		eP	12 17 05.7	1	0.6		R	
		e	10.6		0.6			
		e	26.8		0.6			
		e	41.0		0.6			
	E	eSur	20 39.6		0.7			
01 Sept		eP	16 49 04.8	1	1.0		T	Fiji Islands region
								16.4 S 176.6 W
								h about 437 km
								0 = 16 36 49.9
01 Sept		eP	17 43 49.8	2	0.8		T	
01 Sept		eP	18 53 41.5	9	0.9		T	Fiji Islands region
								18.0 S 178.3W
								h about 619 km
								0 = 18 41 32.4

DATE	Syst.	Phase	Arrival Time G.C.T.	Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h. m. s.					
01 Sept		eP	18 55 25.0	999			T	Off coast of Guatemala
		e	59 17.8		0.7			13.5 N 92.5 W
	LPE	eSur	26					h about 37 km
		ePcS	19 03 04.7		1.3			0 = 18 50 35.4
								Mag. 6-1/2 (Pas), 6 (Berk).
								Very strong surface waves on all systems.
01 Sept		eP	19 12 22.3	4	1.0		T	Honshu, Japan
		e	55.0		0.6			35.4 N 138.8 E
								h about 87 km
								0 = 18 59 36.3
01 Sept		eP	19 29 15.9	8	1.2		T	Possible PKKP of previous event
		e	58.2		1.2			
01 Sept		eP	19 39 12.6	5	1.1		T	Possible P'P' of previous event
01 Sept		eP	19 56 06.2	2	0.8		T	
01 Sept		eP	20 19 32.9	56	1.2		T	Near coast of Honduras
		e	59.2		0.8			15.2 N 87.3 W
	E	e(Sur)	23 41.2		0.8			h about 75 km
								0 = 20 14 56.8
01 Sept		eP	20 55 55.3	1	0.4		NR	
		e	58.7		0.4			
		eSur	56 35.2		0.5			
02 Sept		eP	00 24 24.9	1	0.4		NR	$\triangle$(S-P) = 3.6°
	E	eS	25 07.4		0.5			

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
02 Sept		eP	00	35	24.7	27	1.0		T	Fox Islands, Aleutian Islands
		e			38.1		1.6			
		e		37	32.5		1.2			
	LPN	eS		42	56		20.0			
	LPN	eSS		46	51		23.0			
	LPN	eSur		50	24					
	LP	eSur		52	59					
										52.0 N 170.9 W
										h about 39 km
										0 = 00 26 06.2
										Strong surface on LP.
										Weak surface on BB.
02 Sept		eP	01	06	32.9	1	1.0		T	
02 Sept		eP	01	15	05.7	1	0.8		T	
02 Sept		eP	01	59	03.3	3	0.8		T	
		e			11.7		0.8			
		e			21.1		1.0			
02 Sept.		eP	02	01	10.1	3	1.0		T	Possible phase of previous event
02 Sept		eP	03	38	48.8	1	1.0		T	
02 Sept		eP	03	55	19.0	1	0.6		T	
02 Sept		eP'	04	05	50.0	9	1.3		T	West of Macquarie Island
	LP	eSur		48	00					
										56.6 S 147.1 E
										h about 41 km
										0 = 03 46 36.8
										Medium surface waves on LP
02 Sept		eP	06	32	32.2	3	1.2		T	Kermadec Islands region
	LP	eSur	07	17	30					
										28.6 S 176.5 W
										h about 23 km
										0 = 06 18 59.9
										Weak surface waves on LP may be separate.
02 Sept		eP	06	44	32.1	3	1.0		T	

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
02 Sept		eP	07	12	31.8	2	0.8		T	
		e		13	00.0		1.0			
		e			29.6		0.7			
		e(Sur)		16	11.0		0.8			
02 Sept		eP	07	45	58.1	2	0.6		T	Near coast of Hokkaido, Japan
										42.2 N 142.6 E
										h about 31 km
										0 = 07 33 24.3
02 Sept		eP	09	16	46.0	1	0.8		T	
02 Sept		eP	10	09	44.5	3	1.0		T	
		e			52.7		1.0			
02 Sept		iP'	11	10	01.5	c	331		T	Southwest of Maldive Islands, Indian Ocean
	BB	e			19		8.0			
		e		12	41.4		2.8			2.0 S 67.5 E
		eSKP		13	14.9		1.6			h about 132 km
	LPE	eSS		32	17		20.0			0 = 10 50 36.7
	LP	eSur		52	00					Medium surface waves on LP
	LP	eSur	12	04	00					
02 Sept		eP	12	36	21.8	2	0.8		T	
		e		37	59.8		1.0			
02 Sept		eP	14	29	04.2	5	1.0		T	Near coast of Greece
		e			35.2		0.8			38.9 N 23.6 E
										h about 20 km
										0 = 14 16 08.6
02 Sept		eP'	18	12	05.1	22	1.1		T	Soenda Strait
		e			42.0		0.8			6.0 S 105.9 E
		e			59.2		0.9			h about 127 km
										0 = 17 52 46.1
03 Sept		eP	00	59	42.0	2	0.6		T	

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
03 Sept		eP	04	53	37.9	999			T	Near coast of Nicaragua
		e		54	00.8		0.6			12.1 N 86.9 W
	E	e		57	50.8		1.0			h about 124 km
	E	e(S)		58	01.8		1.6			0 = 04 48 25.6
	LPN	eSS			44		13.0			
		eScP	05	00	40.8		0.7			
03 Sept.		eP	05	26	41.5	3	1.0		T	
03 Sept		eP	06	23	04.7	2	0.8		T	
		e			10.1		1.0			
		e		26	38.5		1.2			
03 Sept		eP	07	16	35.7	1	0.6		T	
03 Sept		eP	07	50	47.7	3	0.8	SE	T	
03 Sept		eP	08	54	11.7	6	1.0		T	
03 Sept		eP	10	26	17.6	3	0.8		T	Columbia
										6.4 N 73.4 W
										h about 86 km
										0 = 10 19 20.3
03 Sept		eP	12	46	25.0	1	0.6		T	
03 Sept		eP	17	40	36.8	5	0.6		T	Near coast of Kamchatka
		e		41	00.3		0.6			51.8 N 158.9 E
										h about 22 km
										0 = 17 29 20.6
03 Sept		eP	20	37	00.6	1	0.5		R	
	E	eSur		40	59.8		0.9			
03 Sept		eP	23	11	49.2	3	0.6		R	
		e		12	11.6		1.0			
		eSur		15	37.4		1.2			

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
04 Sept		eP	01	02	43.9	5	1.0		T	Near Islands, Aleutian Islands
		e		03	13.5		0.8			52.1 N 173.4 E
										h about 41 km
										0 = 00 52 23.5
04 Sept		eP	01	55	35.5	1	0.9		T	
04 Sept		eP	02	07	15.3	1	0.6		T	
		e		08	05.2		1.0			
04 Sept		eP	03	30	04.2	2	0.8		T	South of Honshu, Japan
		e		31	00.7		1.1			30.0 N 138.3 E
										h about 492 km
										0 = 03 17 24.6
04 Sept		eP	03	54	43.8	2	0.9		T	
04 Sept		eP	04	37	01.2	4	1.1		T	
		e			17.4		1.3			
		e		39	06.7		1.4			
04 Sept		eP	04	39	58.8	2	0.6		T	Possible PcP of previous event
04 Sept		eP	05	05	01.2	7	1.3		T	Kurile Islands
		e			11.8		0.8			46.9 N 154.2 E
		e			37.8		1.0			h about 22 km
	LPN	eS		14	43		14.0			0 = 04 53 12.9
	LP	eSur		30	52					Weak surface waves on LP
04 Sept		eP	08	34	39.3	1	0.6		T	
		e			46.8		0.6			
		e		35	03.8		0.8			

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
04 Sept		iP	09	59	01.3	c100	1.0		T	Andreanof Islands, Aleutian Islands
		e			11.4		1.2			51.4 N 178.1 W
	LPE	e(PcS)	10	04	03		16.0			h about 35 km
	LPE	eS		06	59		19.0			0 = 09 49 10.7
	IBE	ePS		07	14		3.0			Strong surface waves on LP.
	N	e(ScS)		08	46.8		2.0			Weak surface on BB.
	LPE	eSS		10	44		25.0			
	LP	eSur		15	47					
	LP	eSur		17	48					
		eP'P'$_1$		28	34.7		1.2			
		eP'P'$_2$			54.4		1.2			
04 Sept		eP	12	23	57.6	1	0.5		T	
04 Sept		eP	14	43	08.9	2	0.6		T	
04 Sept		eP	15	35	14.2	2	0.9		T	
		e		36	15.8		0.8			
04 Sept		eP'	16	28	04.0	2	1.0		T	Halmahera
		e			43.8		1.0			1.3 N 127.7 E
										h about 156 km
										0 = 16 09 20.1
04 Sept		eP	16	34	17.4	2	1.0		T	
		e			25.4		0.9			
		e			45.4		0.8			
04 Sept		eP	17	26	07.3	3	1.0		T	New Islands, Aleutian Islands
		e			17.0		0.8			52.1 N 173.8 E
										h about 67 km
										0 = 17 15 49.7
04 Sept		eP	18	53	54.1	9	1.6		T	Fox Islands, Aleutian Islands
		e		54	06.8		0.6			52.9 N 167.3 W
		e			24.6		0.8			h about 74 km
		e			56.1		0.7			0 = 18 45 02.3
	LP	eSur	19	10	00					Phase at 18 54 24.6 possible new event
										Medium surface on LP.

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
04 Sept		eP	19	21	30.2	5	1.2		T	Fox Islands, Aleutians
		e			38.5		1.2			52.8 N 167.1 W
	LP	eSur		39	00					h about 47 km
										0 = 19 12 34.4
										Weak surface on LP.
04 Sept		eP	22	46	25.3	1	0.6		T	Tonga Islands
		epP		47	08.0		1.5			20.2 S 175.8 W
										h about 181 km
										0 = 22 33 34.6
04 Sept	E	eSur	23	45	02.0		1.5		T	
	LPE	e(Sur)			20					
05 Sept		eP	00	52	28.0	4	0.6		T	Near coast of Greece
	LPE	eSur	01	22	00					38.4 N 23.5 E
										h about 25 km
										0 = 00 39 30.3
										Weak surface on LP
05 Sept		eP	00	59	13.2	2	0.6		T	Samoa Islands region
		e			22.0		0.8			16.2 S 172.6 W
		e			29.4		1.5			h about 49 km
	LPN	eS	01	09	43		15.0			0 = 00 46 29.6
05 Sept		eP	01	29	48.4	3	0.8		T	Near coast of Greece
										38.3 N 23.5 E
										h about 25 km
										0 = 01 16 50.2
05 Sept		eP	02	47	23.5	30	1.2		T	Arctic Ocean
	LPE	eS		55	19		16.0			80.0 N 2.3 W
	LPN	eSS		59	09		19.0			h about 18 km
	LPE	eSur	03	01	00					0 = 02 37 34.9
	LP	eSur		07	00					Strong surface on LP.
										Medium surface waves on BB.
05 Sept		eP	02	55	06.0	2	0.8		T	

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
05 Sept		eP	06	27	11.9	1	0.6		T	Tadzhik S.S.R.
		e		32	03.0		0.8			38.6 N 73.3 E
	LPE	eSKS		37	32		17.0			h about 50 km
	LP(N)	e(S)		38	30		17.0			0 = 06 12 54.8
	LPE	ePS		40	30		15.0			Strong surface waves
	LPE	ePPS		41	27		18.0			on LP.
	LPE	e(SS)		46	26		17.0			
	LPE	e(SKKS)		49	15		15.0			
	LPE	e		53	15		18.0			
	LPE	eSur	07	00	00					
	LPE	eSur		01	40					
05 Sept		eP	11	42	25.0	999			T	Kenai Peninsula
		e			37.1	999				59.8 N 150.6 W
	LP	ePP		44	09		13.0			h about 44 km
	LPE	ePcS		48	00		25.0			0 = 11 34 37.3
	LPE	eS			31		14.0			Strong surface waves
	LPE	eSS		51	30		22.0			on all systems.
	LPE	eSur		52	11					
	LP	eSur		54	56					
05 Sept		eP	15	08	58.6	1	0.7		T	
05 Sept		eP	17	12	02.4	2	0.5		T	
		e			16.8		0.6			
05 Sept		eP	18	03	10.3	1	0.4		NR	$\triangle$(S-P) = 1.8°
		e			20.2		0.4			
		eS			33.0	999				
05 Sept		eP	21	49	41.3	1	0.3		NR	$\triangle$(S-P) = 1.7°
		e			44.7		0.5			
		eS		50	02.9	999				
05 Sept		eP	21	52	53.3	4	0.9		T	
05 Sept		eP	23	48	25.8	2	0.4		NR	$\triangle$(S-P) = 1.7°
	E	eS			46.8		0.5			

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
06 Sept		eP	01	09	55.4	3	0.3		L	$\triangle$(S-P) = less than 0.1°
		e			56.4		0.3			
		eS			59.0	999				
06 Sept		eP	03	07	45.8	3	1.0		T	
06 Sept		eP	03	31	46.2	2	0.8		T	
		e			58.0		1.1			
06 Sept		eP	04	21	54.8	4	0.8		T	
06 Sept		eP	06	40	02.5	1	0.8		T	
06 Sept		eP'	08	33	13.8	40	1.6		T	Molucca Passage
		e		35	04.8		1.4			2.8 N 125.8 E
		e		36	17.6		1.0			h about 58 km
		e(SKP)		37	03.6		2.3			0 = 08 14 17.4
		e			34.4		1.4			Medium surface waves
		ePKKP		42	57.9		1.0			on LP and BB may be
	LPE	eSur	09	37	00					separate.
06 Sept		eP	08	38	19.2	2	0.8		T	Possible phase of previous event
06 Sept		eP	09	32	01.4	1	0.6		T	
		e			13.3		0.6			
06 Sept		eP	09	48	56.9	5	1.0		T	
06 Sept		eP	09	51	28.0	5	0.6	SSE	T	
		e			44.2		0.8			
06 Sept		eP	10	25	16.8	2	0.6		T	
		e			33.6		0.8			
06 Sept		eP	10	44	16.8	1	0.7		T	
06 Sept		eP	11	00	16.2	2	0.8		T	
		e		03	06.1		0.6			

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
06 Sept		eP	12	35	04.8	3	1.1		T	
06 Sept		eP	13	05	12.4	18	1.6		T	
		e		06	48.4		0.9			
		e		27	23.2		1.2			
06 Sept		e(PP)	13	54	07.8		1.0		T	Hindu Kush 36.3 N 70.6 E h about 238 km 0 = 13 35 42.2
06 Sept		eP	14	04	58.2	1	0.4		T	
06 Sept		eP	15	39	05.3	12	0.9		T	Near coast of Peru
		e			13.0		0.9			10.8 S 79.1 W
		ePcP		40	29.8		0.9			h about 45 km
		ePP			59.3		2.3			0 = 15 30 20.4
		eScP		44	23.3		1.1			Weak surface waves
	LPN	eS		46	10		13.0			on LP.
	N	eScS		48	56.0		1.8			
	LPN	e(Sur)		49	55					
	LPN	eSur		59	00					
06 Sept		eP	16	16	41.1	2	0.8		T	
06 Sept		eP	16	58	21.0	2	0.4		R	
		e		59	07.4		0.4			
		eSur			39.6		0.5			
06 Sept		eP	17	56	55.2	4	0.7	N	T	
06 Sept		eP	19	17	44.5	3	1.0		T	
06 Sept		eP	19	47	27.2	2	0.8		T	
07 Sept		eP	00	52	12.1	1	0.6		NR	$\triangle$(S-P) = 4.1°
	N	eS		53	00.0		0.4			
07 Sept		eP	02	34	34.3	2	0.8		T	

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
07 Sept		eP	04	35	48.1	2	0.8		T	
07 Sept		eP	05	39	10.7	1	0.6		T	
07 Sept		eP	06	53	02.9	1	0.6		T	
07 Sept		eP	12	25	46.7	1	0.4		NR	$\triangle$(S-P) = 1.7°
		e			56.3		0.4			
	N	eS		26	08.7		0.5			
07 Sept		eP	13	17	26.7	2	1.0		T	
07 Sept		eP	17	50	01.6	2	0.5		NR	$\triangle$(S-P) = 2.2°
	E	eS			28.1		0.5			
07 Sept		eP	17	59	17.2	4	0.8		T	
		e			25.5		0.6			
07 Sept		eP	18	01	21.8	1	0.3		NR	$\triangle$(S-P) = 1.7°
		eS			43.6	999				
07 Sept		eP	18	12	33.4	1	0.3		NR	$\triangle$(S-P) = 4.2°
		eS		13	25.3		0.5			
07 Sept		eP	21	43	11.1	21	0.4		NR	$\triangle$(S-P) = 1.7°
		e			20.0		0.5			
		eS			32.2	999				
07 Sept		eP	22	33	53.0	2	0.9		T	
07 Sept		eP	23	19	21.8	2	0.9		T	
07 Sept		eP	23	53	26.0	3	0.5		NR	$\triangle$(S-P) = 3.8°
	N	eS		54	10.4		0.5			
08 Sept		eP	00	12	58.2	6	1.0		T	Alaska
		epP		13	23.0		1.0			63.1 N 150.5 W
		eScP		18	28.4		1.0			h about 135 km
										0 = 00 05 13.8

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
08 Sept		eP	00	49	53.4	1	0.4	SW	NR	△(S-P) = 4.1°
	E	eS		50	41.7		0.4			
08 Sept		eP	01	03	26.9	2	0.9		T	
08 Sept		eP	02	28	09.2	1	0.9		T	
08 Sept		eP	02	54	28.4	4	1.0		T	Fiji Islands region 16.2 S 175.0 W h about 153 km 0 = 02 41 49.1
08 Sept		eP	03	13	22.4	42	2.0		T	Southwest of Juan Fernandez Islands 40.9 S 90.2 W h about 25 km 0 = 03 01 34.9
		e			42.6		2.3			
	LPE	eSS		28	00		15.0			
08 Sept		iP	04	58	08.0	c128	1.1		T	Queen Charlotte Islands 51.8 N 131.2 W h about 54 km 0 = 04 52 10.3 Strong surface waves on all systems. Mag. 5 (Berk)
	LPE	eS	05	03	07		21.0			
	LPE	e(PcS)		04	42		17.0			
	LPE	eSur		06	40					
	LP	eSur		07	45					
	E	e(ScS)		08	29.0		3.0			
08 Sept		eP	06	05	06.8	3	1.0		T	
		e			18.4		0.6			
		e		07	13.0		0.8			
08 Sept		eP	06	15	22.7	2	0.6		T	Near coast of Ecuador 1.5 S 81.0 W h about 56 km 0 = 06 07 55.0
		e			32.2		0.9			
08 Sept		eP	06	53	26.4	4	1.2		T	

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
08 Sept		eP	07	26	00.4	1	0.5		R	
		e		27	09.2		0.6			
	E	eSur			25.4		0.7			
		e			37.0		1.3			
08 Sept		eP	08	41	21.5	2	1.0		T	Fiji Islands region 20.1 S 177.5 W h about 552 km 0 = 08 29 03.5
08 Sept		eP	09	08	15.2	2	0.9		T	
08 Sept		eP	10	36	31.8	2	0.8		T	
		e			41.4		0.8			
08 Sept		eP	10	51	25.6	1	0.7		T	
08 Sept		eP	11	40	44.5	456	2.4		T	Sandwich Islands region 56.1 S 27.3 W h about 125 km 0 = 11 26 32.8 Mag. 7-1/2 - 7-3/4 (Pas), 8 (Berk). Strong surface waves on LP. Strong surface on BB. Initial arrival is P diffracted.
		e		43	58.9		1.2			
		eP'		44	47.4	33	1.0			
		e		45	07.4		1.5			
		e			17.4		1.0			
	E	eSKS		51	13.4		2.3			
	E	e			29.4		2.4			
	E	eSKKS		52	07.4		2.4			
	E	e(S)			43.4		4.0			
		ePS		54	31.4		5.0			
		$ePKKP_1$		55	56.6		0.6			
		$ePKKP_2$		56	09.4		0.8			
		e		58	09.0		1.8			
	LPE	eSS	12	00	00		18.0			
		e		03	35.4		4.5			
		e		04	14.4		3.0			
	LP	eSur		12	50					
08 Sept		eP	12	23	30.4	2	0.5		T	
08 Sept		eP	12	38	57.1	3	1.0		T	

DATE	Syst.	Phase	Arrival Time G.C.T.	Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h. m. s.					
08 Sept		eP	12 56 01.0	3	1.0		T	South of Fiji Islands 25.1 S 179.1 W h about 450 km 0 = 12 43 36.2
08 Sept		eP	13 29 38.5	2	0.8		T	
08 Sept		eP	15 50 16.0	5	1.1		T	
08 Sept		eP	17 41 50.8	3	1.0		T	
08 Sept		eP	20 39 42.0	1	0.7		NR	△(S-P) = 4.3°
	E	eS	40 32.4		0.7			
08 Sept		eP	20 45 26.6	1	0.5		NR	
		e	31.5		0.4			
		e	34.2		0.5			
	E	eSur	46 15.4		0.5			
08 Sept		eP	20 53 07.7	1	0.4		NR	
		e	11.1		0.4			
	E	eSur	47.7		0.5			
08 Sept		eP	21 07 03.7	1	0.3		NR	△(S-P) = 2.0°
	N	eS	27.9		0.4			
08 Sept		eP	21 29 05.7	2	0.3		NR	△(S-P) = 1.8°
		e	25.1		0.3			
	E	eS	28.0	999				
08 Sept		eP	22 21 18.8	1	0.8		T	
08 Sept		eP	22 38 47.6	1	0.8		T	
		e	56.2		0.8			
08 Sept		eP	23 47 59.8	2	0.9		T	
09 Sept		eP	00 01 16.5	1	0.6		R	
	E	eSur	02 46.0		0.7			

DATE	Syst.	Phase	Arrival Time G.C.T.	Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h. m. s.					
09 Sept		eP	00 13 24.7	4	1.2		T	
		e	15 20.3		1.6			
		e	49.7		1.0			
09 Sept		eP	02 59 25.4	10	1.0		T	
09 Sept		eP	03 51 47.8	2	0.4		T	Phase at 03 52 28.4 possible new event.
		e	52 28.4		1.1			
09 Sept		eP	05 47 05.4	1	0.7		T	
09 Sept		eP	07 46 27.7	3	1.1		T	
09 Sept		eP	08 29 56.1	9	1.6		T	
09 Sept		eP	09 19 32.7	15	1.4		T	Fox Islands, Aleutian Islands 52.5 N 169.4 W h about 61 km 0 = 09 10 25.2 Strong surface on LP
		e	20 15.3		0.9			
		e(PP)	21 45.3		1.5			
	LPN	eS	26 52		19.0			
	LPN	eSur	34 35					
	LP	eSur	38 00					
09 Sept		eP	09 29 04.5	2	0.6		T	Off coast of Honshu, Japan 33.8 N 139.6 E h about 151 km 0 = 09 16 08.6
		e	39.0		0.9			
09 Sept		eP	11 27 19.3	3	0.5	SSE	T	
		e	26.7		0.7			
09 Sept		eP	11 53 00.6	1	0.6		T	
09 Sept		eP	11 56 46.3	5	1.3		T	Andreanof Islands, Aleutian Islands 51.7 N 174.9 W h about 50 km 0 = 11 47 12.4 Weak surface waves on LP
		e	57 28.6		0.8			
	LPE	eSur	12 11 30					

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
09 Sept		eP	16	01	09.4	13	0.7	SE	T	Medium surface waves
	E	eSur		04	46.0		0.6			on LP may be separate
	LPE	eSur		13	02					
09 Sept		eP	19	17	28.3	83	1.4		T	Galapagos Islands
		e(PP)		18	55.3		1.7			1.5 N 90.6 W
		e(PcP)		20	06.2		0.8			h about 54 km
	LPN	eS		22	56		11.0			0 = 19 10 47.6
	LPE	e(SS)		24	42		18.0			Medium surface waves
	BB	eSur		30	12					on LP and BB
09 Sept		eP	19	54	57.4	3	0.9		T	
		e		56	02.1		1.5			
09 Sept		eP	20	05	01.9	5	0.8		T	
		e			10.6		0.7			
09 Sept		eP	22	44	34.1	1	0.3		R	$\triangle$(S-P) = 7°
		e			47.1		0.4			
		e			58.9		0.7			
	E	eS		45	56.6		0.5			
		eSur		46	33.2	999				
09 Sept		eP	23	23	47.8	2	0.5		NR	
	E	e		24	23.8		0.6			
	E	eSur			31.5		0.6			
10 Sept		eP	00	08	31.7	1	0.5		NR	
	N	e		09	15.6		0.5			
10 Sept		eP	01	54	32.8	6	0.8		T	Off south coast of
		e			45.3		0.8			Kamchatka
										49.2 N 158.2 E
										h about 33 km
										0 = 01 43 07.2

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
10 Sept		eP	04	55	24.6	56	1.0		T	Salta Province,
		ePcP			50.7		1.0			Argentina
		epP		57	15.5		1.0			22.7 S 63.1 W
		ePP			52.4		1.4			h about 519 km
		eScP		59	01.9		0.8			0 = 04 45 27.1
	N	eS	05	03	30.0		2.4			Phase at 05 05 16.5
		eScS		04	29.0		2.7			possible new event.
		e		05	16.5		0.8			
		ePKKP		15	16.7		1.1			
		eP'P'$_1$		23	13.5		1.2			
		eP'P'$_2$			39.4		1.1			
10 Sept		eP	05	09	02.7	1	0.5		T	
		e			25.3		1.5			
10 Sept		eP	05	32	08.5	2	1.0		T	
10 Sept		eP	06	08	51.3	4	1.4		T	
10 Sept		eP	06	24	05.5	6	0.5	SE	R	
		eSur		26	42.8		0.5			
10 Sept	E	e(Sur)	06	50	32.0		1.2		T	
10 Sept		eP	07	21	26.6	1	0.6		T	
10 Sept		eP	09	11	22.3	3	0.8		T	Weak surface on LP
		e			36.6		0.8			
	LPE	eSur		38	25					
10 Sept		eP	10	55	35.9	3	0.4		T	
10 Sept		eP	11	02	52.6	1	0.7		T	
10 Sept		eP	11	55	30.8	10	0.7	SE	T	
10 Sept		eP	13	11	04.6	1	0.7		T	

DATE	Syst.	Phase	Arrival Time G.C.T.			Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h.	m.	s.					
10 Sept		eP	14	58	26.9	2	0.8		T	Tonga Islands region 19.3 S 175.8 W h about 219 km 0 = 14 45 43.4
10 Sept		eP	15	45	57.0	14	0.9	SE	T	
		eSur		50	02.0		1.1			
10 Sept		eP	16	30	49.8	1	0.8		T	Turkey 37.2 N 36.6 E h about 28 km 0 = 16 17 20.0
10 Sept		eP	17	54	22.8	1	0.8		T	Near coast of Northern Chile 24.4 S 70.1 W h about 77 km 0 = 17 43 47.6
10 Sept		eP	18	22	23.8	4	1.2		T	Kermadec Islands region 27.6 S 177.8 W h about 152 km 0 = 18 09 07.3
		e		23	11.0		1.6			
10 Sept		eP	18	28	16.6	3	0.9		T	Fiji Islands region 17.8 S 178.5 W h about 619 km 0 = 18 16 07.5
10 Sept		eP	19	51	15.2	1	0.6		T	
11 Sept		eP	02	56	44.6	17	1.1		T	Andreanof Islands, Aleutian Islands 51.3 N 179.7 W h about 15 km 0 = 02 46 43.4 Medium surface waves on LP
		e		57	55.1		0.9			
	LPN	e(Sur)	03	14	00					
	LP	eSur		17	30					

DATE	Syst.	Phase	Arrival Time G.C.T.			Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h.	m.	s.					
11 Sept		eP	03	12	13.6	2	1.0		T	
11 Sept		iP	04	44	58.4	c 283	1.8		T	Off coast of California 43.5 N 127.2 W h about 23 km 0 = 04 39 44.9 Medium surface on LP. Weak surface on BB.
	LPN	eS		49	27		13.0			
	LPN	eSur		51	00					
	LP	eSur		53	00					
11 Sept		eP	06	07	28.0	6	0.9		T	La Rioja Province, Argentina 28.3 S 67.9 W h about 60 km 0 = 05 56 25.5
		ePcP			52.9		0.6			
		e		08	11.4		0.8			
		e			37.6		1.0			
11 Sept		eP	08	35	40.6	2	0.8		T	
11 Sept		eP	09	12	39.1	1	0.6		T	Andreanof Islands Aleutian Islands 51.0 N 179.9 W h about 25 km 0 = 09 02 39.4
11 Sept		eP	09	24	24.8	2	0.8		T	Kamchatka 52.9 N 160.6 E h about 25 km 0 = 09 13 18.6
11 Sept		eP	09	56	49.2	9	1.4		T	Kurile Islands 44.7 N 150.5 E h about 25 km 0 = 09 44 36.6
11 Sept		eP	10	17	24.2	1	0.7		T	
11 Sept		eP	11	24	22.6	2	0.9		T	
11 Sept		eP'	11	55	53.6	22	1.6		T	Northern Celebes 1.1 N 120.3 E h about 81 km 0 = 11 36 48.4

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
11 Sept		eP	14	58	59.1	10	1.2		T	Mendoza Province, Argentina
		e		59	07.5		1.2			36.6 S 69.0 W
										h about 226 km
										0 = 14 47 30.5
11 Sept		eP	18	02	01.9	1	0.4		NR	$\triangle$(S-P) = 1.7°
	E	eS			23.5		0.4			
11 Sept		eP	19	44	15.5	4	0.7	SE	T	
11 Sept		eP'	20	16	55.2	4	1.0		T	Aroe Islands
	LPE	eSur		56	00					4.1 S 134.3 E
	LPE	eSur	21	02	30					h about 19 km
										0 = 19 57 58.2
										Weak surface on LP.
11 Sept		eP	20	32	56.0	5	0.9		T	
11 Sept		eP	20	45	02.7	2	1.0		T	
11 Sept		eP	22	22	30.2	22	0.6		T	Off north coast of Venezuela
		ePP		24	08.4		1.5			10.8 N 62.4 W
		ePcP			31.3		0.5			h about 134 km
										0 = 22 15 02.6
11 Sept		eP	22	59	02.7	999		ESE.	NR	$\triangle$(S-P) = 1.7°
		eS			23.7	999				
11 Sept		eP	23	27	51.8	4	0.6		T	
11 Sept		eP	23	59	45.7	4	0.9		T	Near east coast of Hokkaido, Japan
		e			58.3		1.0			42.8 N 145.4 E
12 Sept		e	00	01	37.6		1.0			h about 18 km
		e		02	22.7		1.0			0 = 23 47 19.5
12 Sept		eSur	00	53	20.0		6.0		T	Medium surface waves
	LPE	eSur			40					on all systems.

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
12 Sept	LPE	eSur	01	06	50				T	Medium surface waves on all systems
12 Sept		eP	01	16	17.7	3	1.1		T	
12 Sept	LPE	e(Sur)	01	16	18				T	Medium surface waves on all systems
12 Sept		eP	01	28	08.9	2	0.9		T	New Hebrides Islands
										18.3 S 169.1 E
										h about 208 km
										0 = 01 14 32.9
12 Sept		eP	01	49	09.4	3	1.0		T	
12 Sept		eP	05	28	34.9	2	0.8		T	
12 Sept		eP	05	45	50.7	6	1.0		T	Southern Alaska
		e		47	55.8		1.1			63.2 N 149.0 W
										h about 72 km
										0 = 05 38 03.5
12 Sept		eP	08	14	12.4	2	0.6		T	Tonga Islands region
										15.1 S 173.6 W
										h about 87 km
										0 = 08.01 34.9
12 Sept		eP	09	32	56.9	17	0.6		T	Off coast of Guatemala
		eSur		36	49.9		0.7			13.9 N 92.3 W
										h about 83 km
										0 = 09 28 14.9
12 Sept		eP	10	19	28.0	5	0.8	N	T	Weak surface waves
	LPN	eSur		51	00					on LP
12 Sept		eP	11	26	49.8	14	0.7		T	Peru-Bolivia border
		ePcP		27	49.8		0.6			10.8 S 69.8 W
		epP		28	33.6		0.8			h about 618 km
		e(PP)			49.2		1.0			0 = 11 18 26.3
		e		29	30.2		0.8			Phase at 11 29 30.2
	E	eS		33	36.2		1.2			Possible new event.

DATE	Syst.	Phase	Arrival Time G.C.T. h. m. s.	Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961								
12 Sept		eP	12 11 16.3	6	0.6		T	Tonga Islands region
		e	42.8		0.6			23.0 S 176.2 W
								h about 39 km
								0 = 11 58 01.4
12 Sept		eP	12 39 18.8	19	1.1		T	Near east coast of
		e	31.0		1.1			Hokkaido, Japan
		e	41 30.2		1.1			43.8 N 147.8 E
		e	42 54.0		1.5			h about 96 km
								0 = 12 27 09.2
12 Sept		iP	15 32 50.0	c 999			L	△(S-P) = less than 0.1°
		eS	52.4	999				
12 Sept		eP	19 22 02.6	25	1.3		R	Baja California
	BB	e	24 30		7.0			32.1 N 115.1 W
	BB	eSur	25 45	999				h about 25 km
		eSur	26 03.0	999				0 = 19 18 39.2
								Mag. 5-1/4 - 5-1/2 (Pas)
								5-1/4 (Berk).
								Strong surface waves
								on all systems
12 Sept		eP¹	19 47 53.2	2	0.9		T	Sandwich Islands
		ePP	48 08.0		1.0			59.4 S 29.2 W
								h about 25 km
								0 = 19 29 05.2
13 Sept		eP	00 33 40.3	2	0.4		NR	△(S-P) = 3.8°
	E	eS	34 24.6		0.6			
13 Sept		eP	00 50 35.8	2	1.0		T	
13 Sept		eP	01 52 15.7	2	1.0		T	
13 Sept		eP	20 10 48.7	1	0.9		T	

DATE	Syst.	Phase	Arrival Time G.C.T. h. m. s.	Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961								
13 Sept		eP	21 31 19.3	246	1.7		T	Southern Chile
		e	33 50.8		1.5			41.6 S 73.2 W
	BBN	eS	41 16		6.0			h about 154 km
								0 = 21 19 26.2
								Mag. 7 (Berk)
13 Sept		eP	23 32 03.7	1	0.3		NR	△(S-P) = 1.7°
	E	eS	25.5		0.6			
13 Sept		eP	23 39 49.4	3	0.4		NR	△(S-P) = 2.3°
	E	eS	40 17.3		0.6			
14 Sept		eP	01 11 53.5	5	0.8	SE	R	Strong surface waves
	E	eSur	15 39.5		1.1			
	LP	e	51		23.0			
	LP	eSur	17 35					
		e	18 44.4		1.0			
14 Sept		eSur	01 20 07.9		1.0		R	
14 Sept		eP	02 19 37.7	2	1.0		T	
14 Sept		eP	02 41 57.5	1	0.2		L	△(S-P) = less than 0.1°
		eS	42 00.2	999				
14 Sept		eP	03 02 10.2	2	1.2		T	
14 Sept		eP	04 54 19.3	2	0.9		T	
14 Sept		eP	06 06 56.0	3	1.0		T	
14 Sept		e	08 21 29.5		1.0		T	
		e	40.5		1.3			
14 Sept		eP	08 33 00.9	3	1.0		T	
		e	10.6		0.7			
14 Sept		eP	08 57 40.6	2	0.8		T	

DATE	Syst.	Phase	Arrival Time G.C.T.			Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h.	m.	s.					
14 Sept		eP	10	07	26.7	2	0.8		T	Weak surface waves on LP
	LPN	eSur		34	00					
14 Sept		eP	10	57	30.9	2	1.0		T	
14 Sept		eP	12	36	54.5	2	0.4		NR	△(S-P) = 1.7°
		e		37	04.0		0.4			
		eS			15.7	999				
14 Sept		eP	14	47	47.7	3	1.1		T	
14 Sept		eP	18	30	13.3	2	0.9		T	
		e		34	04.6		1.2			
14 Sept		eP	18	57	20.6	1	0.5		T	South of Fiji Islands 23.6 S 179.9 W h about 521 km 0 = 18 44 47.0
		e			25.4		0.6			
14 Sept	LP	eSur	19	17	00				T	South Pacific Ocean 56.2 S 139.9 W h about 25 km 0 = 18 31 17.8 Medium surface on LP.
14 Sept		eP	19	29	59.1	3	1.0		T	
14 Sept		eP	19	53	59.2	2	0.2		L	△(S-P) = less than 0.1°
		eS		54	03.2	999				
14 Sept		eP	20	19	05.1	3	1.0		T	
14 Sept		eP	22	03	34.1	4	1.0		T	Near east coast of Honshu, Japan 37.4 N 141.1 E h about 60 km 0 = 21 50 41.3

DATE	Syst.	Phase	Arrival Time G.C.T.			Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h.	m.	s.					
14 Sept		eP	23	29	21.5	1	0.2		NR	△(S-P) = 1.7°
	N	eS			42.5	999				
14 Sept		eP	23	58	31.6	1	0.6		R	
15 Sept		eSur	00	00	28.4		0.5			
		eSur			35.4		0.6			
15 Sept		eP	01	59	42.2	55	1.2		T	Cyprus 35.1 N 33.9 E h about 25 km 0 = 01 46 08.4 Strong surface on LP. Medium surface on BB.
	LPN	eSKS		10	30		17.0			
	LPN	ePS		12	32		22.0			
		ePKKP		16	18.0		0.8			
		e			47.2		1.1			
	LPN	eSS		17	39		21.0			
	LPN	eSSS		21	15		21.0			
		eP'P'		24	30.0		1.0			
	LPN	e(PPP)			55		19.0			
	LPN	e		26	10		22.0			
	LP	eSur		31	00					
15 Sept		eP	04	15	33.3	2	0.7		T	
15 Sept		eP	05	04	25.8	7	0.9	NW	T	
		e			39.6		0.8			
		e			45.6		0.8			
		e			55.4		0.8			
15 Sept		eP	05	49	22.3	3	1.0		T	
15 Sept		eP	10	04	20.9	2	0.5		T	
		e			23.3	11	0.6	SSE		
15 Sept	LP	eSur	10	57	00				T	Solomon Islands 10.1 S 160.7 E h about 66 km 0 = 10 06 36.4 Weak surface on LP

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
15 Sept		eP	17	03	30.3	6	1.3		R	
		e		04	34.0		1.1			
		e			46.0		1.3			
	E	e		06	06.7		2.0			
	E	e			27.0		1.5			
	N	eSur		07	31.4		1.5			
15 Sept		eP	20	10	18.3	1	0.6		T	
		e			24.9		0.6			
15 Sept		eP	21	14	05.3	1	0.5		R	
		e		15	16.5		0.6			
		e			25.4		0.6			
	N	eSur		16	10.0		0.6			
	E	eSur			45.0		0.8			
15 Sept		eP'	21	43	33.0	2	0.7		T	South of Java 10.7 S 112.7 E h about 100 km 0 = 21 24 08.5
15 Sept		eP	23	15	35.4	1	0.3	(N)	L	$\triangle$(S-P) = 1.4°
		eS			53.7		0.4			
15 Sept		eP	23	54	13.4	1	0.3		NR	$\triangle$(S-P) = 3.8°
		eS			58.2		0.6			
16 Sept		eP	03	29	42.4	12	1.0		T	Southern Washington 45.9 N 121.9 W h about 37 km 0 = 03 25 00.3 Medium surface on LP, SP and IB. Weak surface on BB.
	LPE	e		33	45		17.0			
	E	eSur		36	17.5		3.0			
	LPN	eSur			25					
	LP	eSur		38	00					
16 Sept		eP	09	14	09.3	2	0.9		T	
16 Sept		eP	09	19	27.7	3	0.8	NNE	T	Weak surface on LP
	LP	eSur		45	13					

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
16 Sept		eP	09	51	12.8	1	0.6		T	
		e			26.3		0.7			
16 Sept	LPE	eSur	10	55	19				T	Weak surface on LP
	LP	eSur		58	29					
16 Sept		eP	11	09	19.7	1	0.6		T	Weak surface on LP
		e			29.3		0.7	NE		
	LP	eSur		33	00					
16 Sept		eP	12	22	41.4	1	0.9		T	South of Honshu, Japan 28.3 N 138.6 E h about 388 km 0 = 12 09 49.8
16 Sept		eP	13	40	40.8	18	1.3		T	Mid-Atlantic Ocean 14.4 N 46.0 W h about 19 km 0 = 13 31 34.5 Medium surface on LP.
		ePcP		41	55.6		1.0			
	LPE	eScS		50	21		18.0			
	LP	eSur		54	20					
16 Sept		eP	13	45	00.8	2	0.8		T	
16 Sept		eP	15	30	34.5	1	0.7		T	
16 Sept		eP	16	31	23.8	7	0.2		L	$\triangle$(S-P) = less than 0.1° Acoustic wave arrivals from artillery shot visible after initial earth motion.
	N	eS			26.0		0.2			
	N	e			27.2		0.4			
16 Sept		eP	17	28	58.8	8	0.7		T	Kamchatka 52.1 N 158.5 E h about 49 km 0 = 17 17 46.1
		epP		29	12.0		0.8			
		e(sP)			14.0		0.6			
		e			15.5		0.8			
16 Sept		eP	19	20	10.0	1	0.5		T	

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
16 Sept		eP	19	53	11.1	1	1.0		R	San Diego County, California
		e			44.4		0.9			32.7 N 116.2 W
		e		54	23.6		1.0			h about 24 km
	N	eSur		57	25.0		2.0			0 = 19 49 38.6
	LPE	eSur			40					Mag. 4-1/4 (Pas)
	LP	eSur		58	40					Medium surface on all systems.
16 Sept		eP	20	11	10.0	10	0.8		T	Brazil - Peru
		ePcP		12	10.6		0.6			10.6 S 69.8 W
		epP		13	04.5		0.8			h about 629 km
		esP		14	08.0		1.0			0 = 20 02 47.8
		eScP		15	07.9		0.9			
	E	eS		17	49.0		3.0			
	E	ePS		18	36.5		3.0			
	N	eScS		19	53.0		1.0			
16 Sept		eP'	21	35	29.0	4	0.8		T	Indian Ocean
		e			43.3		0.8			900 km southwest of
		e			48.5		0.9			Chagos Islands
		e		39	20.9		0.6			12.8 S 66.3 E
	E	e(SKS)		42	32.7		1.6			h about 25 km
										0 = 21 15 26.9
16 Sept		eP	21	35	36.2	2	0.3		NR	$\triangle$(S-P) = 1.6°
	E	eS			56.6	999				
17 Sept		eP'	01	30	45.2	1	0.8		T	Banda Sea
	LP	eSur	02	15	10					4.1 S 129.7 E
										h about 46 km
										0 = 01 11 43.7
										Weak surface on LP.
17 Sept		eP	02	06	26.0	1	0.6		T	
17 Sept		eP	03	20	38.8	1	0.7		T	Tonga Islands
										22.8 S 175.8 W
										h about 67 km
										0 = 03 07 29.5

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
17 Sept		eP	03	57	09.8	10	0.6	SE	T	Weak surface on LP
		e			25.2		0.8			
		e			29.3		0.8			
	LP	eSur	04	12	45					
17 Sept		eP	04	00	57.4	1	0.5		T	
17 Sept		eP	04	04	31.9	3	0.9		T	
17 Sept		eP	08	56	27.7	1	0.8		T	Off coast of Formosa
		eP'	09	00	24.9	1	0.7			23.9 N 122.2 E
		ePP		01	12.0		1.7			h about 35 km
	LPE	eSKS		07	01		20.0			0 = 08 41 53.6
	LPE	eS		08	39		18.0			Strong surface on LP
	LP	eSP		10	21		20.0			Initial arrival is
	LP	e		11	09		24.0			P diffracted.
		ePKKP			37.5		0.9			
	LPE	e		16	10		22.0			
	LPE	eSSS		20	50		28.0			
	LPE	e		24	58		29.0			
	LP	eSur		29	40					
	LP	eSur		39	25					
17 Sept		eP	10	28	40.3	3	1.0		T	
17 Sept		eP	12	24	10.6	3	1.0		T	
17 Sept		eP	13	12	14.9	1	0.6		T	
17 Sept		eP	14	08	19.4	2	1.1		T	
17 Sept		eP	16	00	42.4	21	1.4		T	Shamania County,
	LPE	eS		04	44		15.0			Washington
	LP	eSur		06	20					45.9 N 122.0 E
	E	eSur		07	06.6		2.5			h about 24 km
	N	eSur			17.9		2.5			0 = 15 55 58.9
		eSur			52.4		2.0			Strong surface on
	E	ePcS		08	26.9		1.8			all systems.
	LP	eSur			50					

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
17 Sept		eP	17	33	04.0	8	1.4		T	
17 Sept		eP	18	02	18.0	1	0.6		T	
17 Sept		eP	21	07	46.2	4	1.1		T	
17 Sept		eP	21	15	46.3	3	1.0		T	
17 Sept		eP	23	36	58.5	1	1.0		T	Near east coast of
		e		37	18.0		1.0			New Guinea
		eP'		40	40.4	7	1.0			5.9 S 147.4 E
		e		41	03.1		1.2			h about 44 km
		ePP			48.3		1.5			0 = 23 22 06.3
		e		43	11.0		0.8			Strong surface on LP.
		eSKP		44	16.1		1.0			eP at 23 36 58.5
	LPE	ePS		51	10		25.0			and e at 23 37 18.0
		$ePKKP_1$			16.7		1.0			are P diffracted.
		$ePKKP_2$			34.8		1.2			
		$ePKKP_3$			50.4		1.2			
	LP	eSPP		52	20.		18.0			
		e		55	37.8		1.2			
18 Sept	LP	eSur	00	15	23					
18 Sept		eP	02	30	59.5	13	0.9		T	Vancouver Island region
	LPN	eS		35	39		20.0			48.8 N 128.9 W
	LPN	eSur		38	05					h about 21 km
	LP	eSur		39	25					0 = 02 25 19.3
										Strong surface on LP and BB.
18 Sept		eP	04	59	58.5	1	0.7		T	Near coast of Ecuador
		e	05	00	05.2		1.0			0.4 S 80.4 W
										h about 16 km
										0 = 04 52 30.9
18 Sept		eP	05	21	47.5	2	0.7		T	Crete
		epP		22	05.9		0.8			35.0 N 26.3 E
	LP	eSur		58	00					h about 83 km
										0 = 05 08 37.7
										Weak surface on LP.

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
18 Sept		eP	06	05	18.9	1	0.6		T	
18 Sept		eP	06	49	02.0	1	0.9		T	
18 Sept		eP	08	10	51.4	1	0.7		T	Weak surface on LP.
	LP	eSur		42	15					
18 Sept		eP	11	09	33.0	2	1.0		T	
18 Sept		eP	11	14	43.1	9	0.9		T	Caspian Sea
		e			54.7		0.7			40.8 N 50.1 E
		e			59.6		0.7			h about 31 km
		e		15	16.4		0.8			0 = 11 01 00.8
		e			54.2		0.7			Strong surface on LP.
		e		17	05.2		0.8			
		e			37.0		1.0			
		e		18	38.5		1.0			
	LP	eSKKS		25	45		10.0			
	LP	eSP		27	35		15.0			
	LP	eSPP		28	14		16.0			
		ePKKP		31	04.6		1.2			
		e			22.7		1.0			
		e			32.4		1.2			
	LPE	eSur		44	40					
	LP	eSur		48	55					
18 Sept		eP	12	08	49.6	3	1.0	W	R	Strong surface waves
		e		09	04.9		1.0			on all systems
	LPE	eSur		12	03					
	N	eSur			34.5		2.2			
	LP	eSur		13	05					
18 Sept	LP	eSP	16	04	35		17.0		T	Loyalty Islands region
	LP	ePSP		05	14		18.0			21.0 S 173.6 E
	LPN	eSS		09	45		25.0			h about 28 km
	LPE	eSur		19	45					0 = 15 37 33.1
	LP	eSur		24	17					Strong surface on LP.
										Weak surface on BB.

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
18 Sept	LP	eSur	17	56	50				T	Medium surface on LP
18 Sept		eP	18	04	00.5	2	0.8		T	
18 Sept		eP	19	45	52.6	2	0.8		T	
		e		46	00.5		0.7			
		e			05.6		0.8			
		e			36.2		0.9			
18 Sept		eP	21	14	13.9	11	1.2	S	T	
		e			20.3		1.2			
18 Sept		eP	21	40	52.0	8	0.9		T	Vancouver Island region
	LPN	eSur		49	23					48.9 N 128.4 W
										h about 46 km
										0 = 21 35 17.2
										Weak surface on LP.
18 Sept		eP	22	36	14.0	6	0.7		T	
		e			21.8		0.7			
18 Sept		eP	22	44	47.6	1	0.6		T	
18 Sept		eP	23	12	35.8	12	0.8		T	
		e			45.0		1.1			
		e			50.0		0.6			
		e		13	16.1		0.9			
19 Sept		eP	00	20	45.2	55	0.9	SE	T	$\triangle$(PcP-P) = 33°
		ePcP		23	28.1		0.8			
19 Sept		eP	00	43	28.2	1	0.5		NR	$\triangle$(S-P) = 3.2°
		e			32.1		0.5			
		e			35.7		0.5	ESE		
	E	eS		44	06.8		0.5			
	E	eSur			20.0		0.5			
19 Sept		eP	01	18	17.9	1	0.6		T	

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
19 Sept		eP	01	20	50.2	1	0.6	SW	T	
19 Sept		eP	01	53	26.8	2	1.0		T	
19 Sept		eP	02	15	01.6	1	0.6		T	
19 Sept		iP	02	35	30.6	c 163	0.8		T	Southern Bolivia
	IB	ePcP		36	01	999				20.3 S 63.2 W
	LP	epP		37	26		16.0			h about 609 km
		ePP			56.0		1.0			0 = 02 25 49.2
	LP	e		39	00		15.0			Mag. 6-1/2 (Pas),
	LP	e			44		14.0			6-1/4 (Berk).
	LP	e		40	48		13.0			
	LPN	eS		43	26		20.0			
	LPN	eScP		44	30		20.0			
	LP	e		45	42		20.0			
	LPN	e		46	20		30.0			
	LPN	eSS		47	40		24.0			
	LPE	e		48	45		38.0			
	LPN	eSSS		51	00		30.0			
		e	03	04	01.0		0.9			
		eP'P'$_1$			10.3		1.0			
		eP'P'$_2$			24.0		1.0			
19 Sept		eP	02	54	01.8	1	0.6		T	
		e			27.1		0.6			
		e			45.7		0.6			
19 Sept		eP	03	01	19.4	2	0.8		T	
		e		02	48.0		1.0			
		e		03	14.7		1.3			
19 Sept		eP	03	03	38.2	5	0.7		T	
19 Sept		eP	03	10	20.5	2	1.0		T	
19 Sept		eP	03	12	22.2	6	1.2		T	
		e		14	32.9		1.0			
		e		15	14.4		1.1			

DATE	Syst.	Phase	Arrival Time G.C.T.			Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h.	m.	s.					
19 Sept		eP	04	40	51.8	2	0.9		T	
19 Sept		eP	05	58	28.4	2	0.8		T	
19 Sept		ePP	06	27	45.6		1.2		T	Mariana Islands
	LP	eSur	07	08	40					14.8 N 146.8 E
										h about 61 km
										0 = 06 09 56.6
										Weak surface on LP.
19 Sept		eP	09	37	49.7	1	0.7		T	
		e		41	04.3		1.1			
19 Sept		eP	09	51	23.2	9	1.2		T	
		e			29.5		1.1			
19 Sept		eP	09	52	39.8	999			T	South of Panama
	LP	ePP		53	35		13.0			6.7 N 82.4 W
	LPE	eS		57	40		27.0			h about 33 km
	LP	eSur	10	02	00					0 = 09 46 17.7
										Mag. 6-1/4 - 6-1/2 (Pas),
										5-3/4 - 6 (Berk).
										Strong surface waves
										on LP and BB.
19 Sept		eP	13	17	03.2	19	1.0	SSE	T	
19 Sept		eP	13	28	04.4	6	1.4		T	
19 Sept		eP	13	51	02.1	2	0.8		T	
19 Sept		eP'	14	03	27.3	6	1.2		T	Molucca Passage
		e			51.6		1.2			1.2 N 125.5 E
		e		05	34.9		1.2			h about 54 km
		ePKKP		13	03.9		0.6			0 = 13 44 28.2
19 Sept		eP	17	12	06.6	2	0.2		L	△(S-P) = less than 0.1°
	N	eS			09.9	999				

DATE	Syst.	Phase	Arrival Time G.C.T.			Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h.	m.	s.					
19 Sept		eP	18	02	05.8	1	0.3		NR	△(S-P) = 1.7°
	N	eS			27.7		0.4			
19 Sept		eP	18	37	48.8	6	0.9		T	Fiji Islands region
										21.6 S 179.4 W
										h about 639 km
										0 = 18 25 29.0
19 Sept		eP	20	18	57.4	2	0.9		T	Caspian Sea
										41.0 N 50.3 E
										h about 54 km
										0 = 20 05 18.3
19 Sept		eP'	21	53	19.5	1	0.7		T	Sandwich Islands region
		ePP			52.2		1.0			60.1 S 22.9 W
	LPE	ePS	22	03	36		16.0			h about 56 km
	LPE	eSS		10	15		32.0			0 = 21 34 43.3
	LPE	eSSS		14	18		20.0			Medium surface on LP
	LP	eSur		28	00					
19 Sept		eP	21	58	16.3	2	0.8		T	
19 Sept		eP	22	04	15.4	9	1.5		T	
19 Sept		eP	23	27	14.8	1	0.3		NR	△(S-P) = 1.7°
		e			23.4		0.4			
		eS			36.0	999				
20 Sept	N	eSur	05	11	58.3		2.0		R	Medium surface waves
	LPE	eSur		12	05					on SP, IB and LP.
	LP	eSur		13	20					
20 Sept		eP	05	54	50.5	4	1.0		T	
20 Sept		eP	06	16	27.6	3	0.8		T	
20 Sept		eP	08	15	24.4	2	0.8		T	
		e			34.1		1.0			

DATE	Syst.	Phase	Arrival Time G.C.T.			Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h.	m.	s.					
20 Sept		eP	08	23	27.2	1	0.7		T	
20 Sept		eP	11	56	01.5	2	0.8		T	
20 Sept		eP	14	45	24.0	7	1.3		T	
20 Sept		eP	18	24	04.5	4	0.8		R	
		eSur		27	45.7		1.5			
20 Sept		eP	19	18	03.6	6	1.0		T	New Britain
		eP'		22	01.9	3	1.0			3.6 S 150.9 E
		ePP			27.4		1.8			h about 30 km
	LP	ePPP		25	03		15.0			0 = 19 03 37.1
	LPE	eSKS		28	48		13.0			Mag. 6-1/2 (Berk).
	LPE	eS		30	15		13.0			Strong surface waves
	LPE	ePS		31	55		20.0			on LP.
	LPE	ePPS		32	51		28.0			Medium surface on BB.
		ePKKP		33	25.6		1.5			Initial arrival is
	LPE	ePKKS		36	50		18.0			P diffracted.
	LPE	eSS		38	16		33.0			
	LPE	eSKKS		40	40		21.0			
	LPE	eSSS		41	52		22.0			
	LP	e		47	38		23.0			
	LPE	eSur		49	15					
	LPE	eSur		54	20					
20 Sept		eP	21	19	47.4	999			NR	$\triangle$(S-P) = 1.6°
		e			56.5		0.5			
		eS		20	08.2	999				
20 Sept		eP	23	26	40.0	1	0.4		NR	$\triangle$(S-P) = 1.7°
	N	eS		27	01.9		0.4			
20 Sept		eP	23	52	21.8	2	0.5		NR	$\triangle$(S-P) = 3.7°
	E	eS		53	05.7		0.4			
		eSur			07.0		0.6			
21 Sept		eP	00	15	42.7	1	0.5		T	

DATE	Syst.	Phase	Arrival Time G.C.T.			Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h.	m.	s.					
21 Sept		eP	00	33	13.3	3	1.0		T	
		e		34	08.6		0.8			
21 Sept		eP	00	35	52.5	1	0.5		T	
21 Sept		eP	03	15	21.7	16	0.8	SSE	T	
21 Sept		eP	10	32	14.9	2	0.7		T	
		e			18.0		0.7			
21 Sept		eP	18	30	03.4	11	0.8		T	Off coast of northern
		e			23.0		0.7			Chile
										26.2 S 70.8 W
										h about 18 km
										0 = 18 19 15.2
21 Sept		eP	19	25	06.6	3	0.9		T	
21 Sept		eP	20	07	23.7	4	1.2		T	
21 Sept		eP	21	19	34.7	4	1.0		T	
22 Sept		eP	03	22	13.7	1	0.7		T	
22 Sept		eP	06	28	25.2	1	0.7		T	
22 Sept		eP	08	12	14.3	1	0.8		T	
22 Sept		eP	08	13	10.5	1	0.6		T	
22 Sept		eP	11	46	54.2	1	0.6		T	
22 Sept		eP	15	27	36.9	2	0.9		T	
22 Sept		eP	18	22	40.5	1	0.3		NR	$\triangle$(S-P) = 1.7°
		e			42.6		0.2			
	E	eS		23	02.0		0.5			

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
22 Sept		eP	21	54	54.4	3	1.0		T	
23 Sept		eP	00	55	49.0	2	0.9		T	
23 Sept		eP	02	49	34.3	1	0.5		T	
23 Sept		eP	03	10	43.1	16	1.3		T	Hawaii Island, Hawaii
		e		11	57.6		1.4			19.8 N 155.2 W
	LPE	eS		18	10		15.0			h about 31 km
	LPE	eScS		20	34		10.0			0 = 03 01 35.7
		e			42.8		1.3			Medium surface waves
	LPE	eSS		21	50		21.0			on LP and BB.
	LPE	eSur		23	23					
	LPE	eSur		25	24					
23 Sept		eP	03	30	31.4	2	0.8	NW	T	Medium surface waves
	LP	eSur	04	01	25					on LP.
23 Sept		eP	04	00	40.9	5	0.8		T	Sea of Japan
										41.7 N 131.9 E
										h about 527 km
										0 = 03 48 29.9
23 Sept		eP	08	29	52.6	1	0.6		T	Kermadec Islands
		e		30	08.2		0.8			28.5 S 177.2 W
										h about 20 km
										0 = 08 16 18.4
23 Sept		eP	08	57	26.5	1	0.7		T	
23 Sept		eP	11	12	03.6	2	0.7		T	
		e			10.7		0.7			
23 Sept		eP	12	46	13.6	2	0.6		T	
23 Sept		eP	15	16	15.7	1	0.7		T	
		e			35.4		0.6			
		eSur		21	48.0		1.2			

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
23 Sept		eP	16	11	10.5	1	0.6		T	
23 Sept		eP	16	58	13.3	2	0.4		NR	△(S-P) = 1.6°
		e			23.3		0.4			
	E	eS			34.2		0.5			
	E	e			35.5	999				
24 Sept		eP	02	37	25.6	1	1.0		T	
24 Sept		eP	09	35	07.4	1	0.7		T	
24 Sept		eP	11	41	27.0	1	0.3		L	△(S-P) = less than 0.1°
	E	eS			30.5	999				
24 Sept		eP	15	25	48.5	2	1.1		T	
24 Sept		ePP	17	11	37.3		0.9		T	Sandwich Islands
		ePKKP		22	28.6		1.0			56.5 S 26.2 W
		e		23	14.5		1.0			h about 25 km
										0 = 16 52 40.8
24 Sept		eP	17	25	27.5	1	0.3		NR	△(S-P) = 1.7°
		e			30.5		0.5			
		e			37.8		0.3			
	E	e			42.7		0.5			
		eS			49.2	999				
24 Sept		eP	19	08	24.2	215	0.9		T	Puebla, Mexico
	LP	e			45		15.0			18.4 N 98.6 W
	LPE	e		09	49		32.0			h about 81 km
	LP	eS		11	33		16.0			0 = 19 04 40.7
	LP	eSur		12	50					Strong surface waves
	LP	e		17	50		20.0			on SP, IB, and LP.
	LP	e		18	57		11.0			Weak surface on BB.
	LP	e		22	35		18.0			
24 Sept		eP	19	34	07.0	6	0.7	SE	T	

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
24 Sept		eP	19	43	38.0	2	0.9		T	
24 Sept		eP	19	46	31.3	1	0.8		T	
		e		47	40.0		1.0			
24 Sept		eP	21	31	55.1	3	0.8		T	
24 Sept		eP	21	38	27.2	3	1.2		T	
24 Sept		eP	21	54	01.8	6	0.8		T	South of Honshu, Japan
		ePP		57	38.5		2.0			33.3 N 141.3 E
	LP	eSKS	22	04	45		22.0			h about 93 km
	LPE	ePS		06	25		28.0			0 = 21 40 58.8
	LP	eSur		22	00					Medium surface waves on LP.
24 Sept		eP	22	41	45.3	3	0.9		T	
25 Sept		eP	01	32	22.4	18	1.7		T	
25 Sept		eP	01	32	57.6	4	0.8		T	Possible phase of preceding event
25 Sept		eP	02	35	02.3	27	1.0		T	Southern Alaska
		epP			26.8		1.2			60.3 N 153.0 W
		eScP		40	31.0		0.8			h about 125 km
	LPN	e		44	50		13.0			0 = 02 27 13.4
	LPN	eSur		49	25					Mag. 5-3/4 - 6 (Berk) Weak surface waves on LP.
25 Sept		eP	03	59	44.2	1	0.8		T	
25 Sept		eP	05	05	22.7	13	1.0	SE	T	

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
25 Sept		eP	05	38	02.5	166	1.2		T	Hawaii Island, Hawaii
		epP			18.0		2.0			19.9 N 155.3 W
		ePcP		39	18.5		1.5			h about 82 km
	LPE	eS		45	30		15.0			0 = 05 29 00.8
	LPE	eScS		47	52		18.0			Mag. 5-3/4 - 6 (Berk).
	LPE	eSS		49	00		22.0			Strong surface waves on LP and BB.
	LPE	eSur		50	42					Weak surface on SP and IB.
	LP	eSur		52	39					
25 Sept		eP	06	07	03.0	6	1.0		T	
25 Sept		eP	06	32	01.5	8	1.0		T	
25 Sept		eP	07	25	31.5	3	0.6		T	
25 Sept		eP	16	05	36.9	1	0.7		T	Fiji Islands
										18.2 S 177.9 W
										h about 667 km
										0 = 15 53 33.2
25 Sept		eP	16	41	54.5	1	0.7		T	
		e		42	09.1		0.8			
25 Sept		eP	18	04	44.1	1	0.3		NR	$\triangle$(S-P) = 1.7°
		e			54.3		0.4			
		eS		05	06.0	999				
25 Sept		eP	18	07	03.1	2	1.0		T	
25 Sept		eP	20	30	24.5	6	1.0		T	Southern Alaska
										61.9 N 150.4 W
										h about 196 km
										0 = 20 22 44.9
25 Sept		eP	20	46	58.2	1	0.3		NR	$\triangle$(S-P) = 1.9°
		eS		47	21.6	999				

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
25 Sept		eP	21	22	43.7	4	1.0		T	Svalbard region
		epP			50.2		1.0			75.9 N 7.3 E
	LP	e(Sur)		42	40					h about 64 km
	LP	eSur		45	35					0 = 21 12 41.0
										Weak surface waves on LP.
25 Sept		eP	23	29	46.7	2	0.3		NR	△(S-P) = 3.1°
		e			48.0		0.5			
		e			49.6	999		SSE		
		eS		30	23.6	999				
26 Sept		eP	01	37	42.4	2	0.8		T	
26 Sept		eP	01	43	04.2	1	0.7		T	
26 Sept		eP	02	35	10.4	1	0.7		T	
26 Sept		eP	04	12	14.8	2	0.7		T	South of Hokkaido, Japan
										40.3 N 144.5 E
										h about 25 km
										0 = 03 59 35.0
26 Sept		eP	06	25	39.2	1	0.6		T	
26 Sept		eP	07	26	01.9	2	0.7		T	Weak surface waves
		e			13.4		1.0			on LP
	LP	eSur	08	01	40					
26 Sept		eP	12	57	17.3	1	1.0		T	Near coast of Central
		e			55.3		1.0			Chile
										37.0 S 73.1 W
										h about 141 km
										0 = 12 45 44.6
26 Sept		eP	18	22	37.6	2	0.8		T	

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
26 Sept		eP	19	06	56.7	4	1.0		T	△(PcP and S-P) = 47°
		ePcP		08	30.2		1.0			Medium surface waves
	LPE	eS		13	50		18.0			on LP.
	LPE	eSur		20	35			ENE		
26 Sept		eP	19	59	52.7	2	0.8		T	
		e	20	00	04.6		0.7			
26 Sept		eP	22	41	58.4	2	0.8		T	Southern Bolivia
		e		42	08.9		0.8			20.1 S 66.0 W
		ePcP			35.9		0.6			h about 265 km
		e			52.0		1.4			0 = 22 31 58.4
26 Sept		eP	23	27	17.2	1	0.3		NR	△(S-P) = 1.7°
		e			26.8		0.4			
	E	eS			38.4	999				
27 Sept		eP	00	58	59.2	4	1.0		T	Fiji Islands region
										15.4 S 175.1 W
										h about 295 km
										0 = 00 46 38.4
27 Sept		eP	01	59	01.8	2	0.7		T	
27 Sept		eP	01	59	18.4	26	1.3		T	Jalisco, Mexico
	LPE	eS	02	02	27		13.0			19.2 N 105.1 W
	E	e			31.5		2.3			h about 54 km
		e		03	02.0		1.4			0 = 01 55 31.9
	LPE	eSur			10					Strong surface on
	E	e			35		1.3			all systems
	E	eSur		04	00.0		3.0			
		eSur			10.0		2.8			
	E	eSur			36.5		2.5			
27 Sept		iP	06	46	16.3	A c 35	0.8		T	Fiji Islands
		epP		48	18.0		1.2			17.4 S 178.7 W
	LP	e		49	18		12.0			h about 576 km
		e			44.4		1.0			0 = 06 34 03.7
		e		51	04.2		1.6			
		e			49.2		1.2			

(continued on next page)

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
	E	eSKS		56	00.0		2.3			(continued from preceding page)
	LPE	eS			37		22.0			
	LPN	ePS		58	57		13.0			
	LPE	ePPS	07	00	00		22.0			
	LPE	eSS		03	00		27.0			
		ePKKP			31.4		0.7			
	LPE	e		09	06		20.0			
		e		11	23.0		1.0			
		eP'P'			37.1		0.9			
	LPE	e		12	41		21.0			
27 Sept		eP	06	58	25.0	2	1.0		T	
27 Sept		eP	07	02	10.2	1	1.0		T	
		e			31.3		1.2			
27 Sept		eP	07	04	13.1	13	1.5		T	
		e		05	42.2		1.1			
		e		06	20.3		0.9			
	N	e(SKS)		14	03.8		1.4			
	N	e		17	53.9		1.5			
27 Sept		eP	07	29	45.6	2	0.5		T	
27 Sept		eP	07	46	21.7	5	1.1		T	
27 Sept		eP	10	28	08.5	1	0.7		T	
		e			34.6		0.7			
27 Sept		eP	11	29	54.2	20	1.0		T	Fox Islands, Aleutian Islands
	LP	e		33	34		20.0			52.3 N 168.7 W
	LPE	eS		37	17		20.0			h about 27 km
	LPN	eSur		44	30					0 = 11 20 46.8
										Medium surface on LP.
										Weak surface on BB.

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
27 Sept		eP	11	34	17.0	1	0.7		R	Medium surface on
		e		35	11.8		0.6			all systems
	E	eSur		38	51.0		2.0			
	LPE	eSur		39	00					
27 Sept		eP	11	47	04.0	1	0.6		T	
27 Sept		eP	12	22	09.9	12	1.4		T	Sandwich Islands
		e		25	16.9		1.0			59.4 S 24.2 W
		e			28.9		1.0			h about 110 km
		eP'		26	06.2	2	0.7			0 = 12 07 39.2
		ePP			45.7		2.2			Strong surface on LP.
		e		28	03.4		1.0			Initial arrival is
		e		30	46.4		1.4			P diffracted.
	LPE	eSKS		32	51		15.0			
	LPE	e		36	23		14.0			
	LPE	ePS		37	00		21.0			
		ePKKP			05.4		1.5			
		e		38	07.7		1.0			
		e			49.9		1.5			
	LPE	eSS		43	02		34.0			
	LPE	eSSS		47	08		24.0			
	LPE	eSur	13	01	15					
	LP	eSur		04	00					
27 Sept		eP	16	50	37.1	2	0.7		T	
27 Sept		eP	18	03	39.6	2	0.2		NR	$\triangle$(S-P) = 1.7°
		e			40.9		0.2			
	E	e			55.0		0.5			
		e			58.4		0.3			
		eS		04	01.5	999				
27 Sept		eP	18	54	10.0	1	0.3		NR	$\triangle$(S-P) = 2.0°
	N	eS			34.4		0.5			

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
27 Sept		eP	19	29	54.6	18	1.0		T	Fox Islands, Aleutian Islands
	LPN	eS		37	18		16.0			52.5 N 168.7 W
	LP	e		38	00		16.0			h about 42 km
	LP	eScS		39	35		14.0			0 = 19 20 48.6
	LP	eSur		49	29					Medium surface waves on LP and BB
27 Sept		eP	19	36	10.0	196	1.5		T	Fox Islands, Aleutians
	LPN	eS		43	32		17.0			55.2 N 168.7 W
	LPN	eScS		45	50		17.0			h about 22 km
	LPE	e		47	23		20.0			0 = 19 27 00.7
	LP	eSur		55	20					Strong surface waves on LP.
		eP'P'$_1$	20	06	50.5		1.1			Medium surface on BB.
		eP'P'$_2$		07	42.8		1.1			
27 Sept		eP	19	43	02.0	8	0.4		NR	$\triangle$(S-P) = 1.7°
		e			11.7		0.4			
		e			22.4	999				
		eS			23.2	999				
		e			25.8		0.5			
27 Sept		ePP	21	25	36.8		1.1		T	Ryukyu Islands
		e(PKKP)		37	21.6		1.0			26.7 N 125.0 E
										h about 17 km
										0 = 21 06 56.3
27 Sept		eP	22	18	47.7	3	0.8		T	
28 Sept		eP	01	06	07.4	3	0.6		T	
28 Sept		eP'	01	43	25.8	129	1.0		T	Sumatra
		ePP		46	42.8		2.0			3.9 S 102.0 E
		eSKP		47	03.0		1.7			h about 78 km
		e		53	20.2		1.0			0 = 01 23 59.6
		ePcPPKP		55	02.1		1.0			Strong surface waves on LP.
	LP	e(SKSP)		56	20		17.0			Medium surface on BB.
	LPE	eSKKS		58	38		15.0			
	LPE	e(SKKKS)	02	00	52		25.0			

(continued on next page)

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
	LPE	e(SS)		05	35		18.0			(continued from preceding page)
	LP	e		16	00		24.0			
	LPE	eSur		31	50					
	LPE	eSur		37	05					
28 Sept		eP	03	37	53.3	5	1.1		T	South of Honshu, Japan
	LPE	eS		48	28		23.0			30.5 N 141.3 E
	LPE	ePS		50	21		18.0			h about 125 km
	LPE	eSS		55	14		20.0			0 = 03 24 43.4
	LPE	ePKKS		58	32		27.0			Strong surface waves on LP.
	LPN	eSur	04	06	20					Medium surface on BB.
	LP	eSur		11	20					
28 Sept		eP	03	41	09.5	8	1.1		T	
		e			29.3		1.5			
		e		42	22.1		1.6			
28 Sept		eP	04	31	55.0	1	0.7		T	
		e		32	39.9		1.0			
28 Sept		eP	05	29	57.3	1	0.5		T	
28 Sept		eP	07	28	44.5	7	0.5		T	
		e			52.9		0.7			
28 Sept		eP	08	07	45.5	8	1.2		T	
		e		08	17.1		0.8			
28 Sept		eP	11	26	39.9	2	0.8		T	
28 Sept		eP	14	00	37.8	1	0.6		T	
28 Sept		eP	16	16	25.4	5	0.8		T	
28 Sept		e(P)	18	53	22.8	2	1.0		R	Yellowstone National Park, Wyoming
		e		54	30.6		0.9			44.7 N 111.0 W
	E	eSur		57	29.2		2.0			h about 20 km
										0 = 18 50 09.3

DATE	Syst.	Phase	Arrival Time G.C.T.			Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h.	m.	s.					
28 Sept		eP	19	33	03.6	2	0.2		L	$\triangle$(S-P) = 0.6°
		eS			13.1		0.3			
		eSur			22.2		0.6			
28 Sept		eP	20	34	13.4	4	0.2		L	$\triangle$(S-P) = 0.3°
		eS			20.5		0.4			
		eSur			31.6		0.6			
28 Sept		eP	21	15	31.4	1	0.5		T	
28 Sept		eP	22	37	07.3	3	0.8		T	
28 Sept		eP'	22	55	02.5	2	0.9		T	Southern Iran
		e			13.6		0.8			27.6 N 57.1 E
		e(PP)			57.4		1.0			h about 56 km
		e(SKP)		58	19.9		1.1			0 = 22 36 27.5
		ePKKP	23	05	42.6		0.9			
28 Sept		eP	23	13	17.4	4	0.7		T	Possible new event
		e		14	08.3		0.7			at 23 14 08.3
		e		15	13.2		0.7			
29 Sept		eP	00	46	18.2	2	0.8		T	
29 Sept		eP	01	55	01.7	1	0.6		T	
29 Sept		eP	03	31	42.0	1	0.7		T	
29 Sept		eP	04	31	03.6	3	0.8		T	
29 Sept		eP	05	50	02.1	5	1.0		T	
29 Sept		eP	06	18	32.9	1	0.6		T	
29 Sept		eP	08	29	50.8	3	0.9		T	Salta Province, Argentina
		ePcP		30	23.4		0.7			22.9 S 66.3 W
										h about 252 km
										0 = 08 19 35.6

DATE	Syst.	Phase	Arrival Time G.C.T.			Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h.	m.	s.					
29 Sept		eP	08	34	09.1	13	1.2		T	
29 Sept		eP'	09	04	26.0	1	0.5		T	Andaman Islands
		e			49.5		0.6			13.8 N 94.0 E
		ePP		06	49.0		1.3			h about 133 km
		eSKP		07	45.2		0.9			0 = 08 45 26.9
		e		08	15.0		0.9			
29 Sept		eP	12	08	49.5	2	0.6		T	
29 Sept		eP	17	02	58.6	11	1.0		T	Near east coast of
		e		03	10.4		1.2			Hokkaido, Japan
										42.9 N 145.4 E
										h about 37 km
										0 = 16 50 32.9
29 Sept		eP	17	42	24.1	2	0.8		T	
29 Sept		eP'	19	25	06.6	25	1.5		T	Northern Celebes
		e			30.6		1.1			0.5 N 122.4 E
		e			59.6		1.1			h about 110 km
		e(PP)		27	26.4		1.5			0 = 19 06 13.4
		e		28	21.6		1.0			Strong surface waves
	LPE	ePKS			54		19.0			on LP.
		e		29	40.6		1.1			Weak surface on BB.
	LPE	eSKS		32	06		22.0			
	LPE	eSKKS		34	00		22.0			
		e			20.5		1.1			
	LP	e(SP)		36	47		25.0			
	LP	ePPS		39	00		29.0			
	LPN	eSS		44	20		22.0			
	LPE	e(SKKKS)		45	14		23.0			
	LPN	eSur	20	00	26					
	LP	eSur		06	32					
29 Sept		eP	20	53	38.2	1	0.5		R	
		eSur		54	55.5		0.5			

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
29 Sept		eP	22	19	55.4	6	0.7		T	
		e		20	02.4		0.7			
29 Sept		eP	22	34	29.2	2	0.2		L	△(S-P) = less than 0.1°
		eS			33.0	999				
29 Sept		eP	22	45	16.4	9	1.1		T	Near coast of southern
		e			23.8		0.9			Colombia
	LP	ePP		46	50		20.0			1.7 N 79.3 W
	LPE	eS		51	03		19.0			h about 60 km
		eScP			19.5		1.1			0 = 22 38 05.9
	LPN	eSS		53	30		19.0			Strong surface waves
	LPE	eSur		55	27					on LP.
	LP	eSur		59	55					Weak surface on BB.
30 Sept		eP	00	33	27.6	2	0.7		T	Kurile Islands
		e			41.5		0.6			44.4 N 148.9 E
	LP	eSur	01	20	00					h about 49 km
										0 = 00 21 18.8
										Medium surface waves
										on LP.
30 Sept		eP	02	00	02.9	2	0.4		T	
		e			17.1		0.7			
30 Sept		eP	03	22	42.2	2	1.0		T	
30 Sept		eP	08	16	51.6	8	0.6	SE	T	
		e		17	28.0		1.1			
30 Sept		eP	09	01	12.8	1	0.6		R	
		eSur		02	34.0		0.7			
30 Sept		eP	09	09	35.7	3	1.1		T	
		e			41.8		0.9			
30 Sept		eP	10	22	29.8	2	1.0		T	

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
30 Sept		eP	11	07	22.6	2	0.6		T	
30 Sept		eP	18	54	52.9	9	0.7		T	
		e		55	08.9		0.7			
		e			35.5		0.7			
		e		57	43.1		0.6			
		eSur		58	46.2		0.8			
30 Sept		eP	19	35	17.8	2	0.9		T	

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Volume 1, No. 10
October 1961

REGISTRATION OF EARTHQUAKES AT WICHITA MOUNTAINS SEISMOLOGICAL OBSERVATORY FORT SILL, OKLAHOMA, U.S.A.

Operated under the Technical Supervision of the
Air Force Technical Applications Center (AFTAC)

by

The Geotechnical Corporation
Garland, Texas

Advanced Research Projects Agency (ARPA)
Department of Defense
United States Government

THE REGISTRATION OF EARTHQUAKES

AT THE

WICHITA MOUNTAINS SEISMOLOGICAL OBSERVATORY

STATION

Station Abbreviation:	WMSO
Station Identification on Film Seismograms:	a
Geographical Location *: (Vault No. 6)	34° 43' 05.3" N. Lat. 98° 35' 20.7" W. Long.
GEOCENTRIC LOCATION*: (Vault No. 6)	34° 32' 09.8" N. Lat. 98° 35' 20.7" W. Long.
ALTITUDE (Meters)*: (Vault No. 6)	505 Meters (1658)

GEOLOGY: The station is located on the Carlton (porphyritic) granophyre of the Wichita Mountains of Oklahoma.

NOISE LEVEL - October 1961: The periods of the predominant microseisms at WMSO are 0.5 second and 6 seconds. An amplitude distribution curve for the 0.5 second microseisms may be found on page 2.

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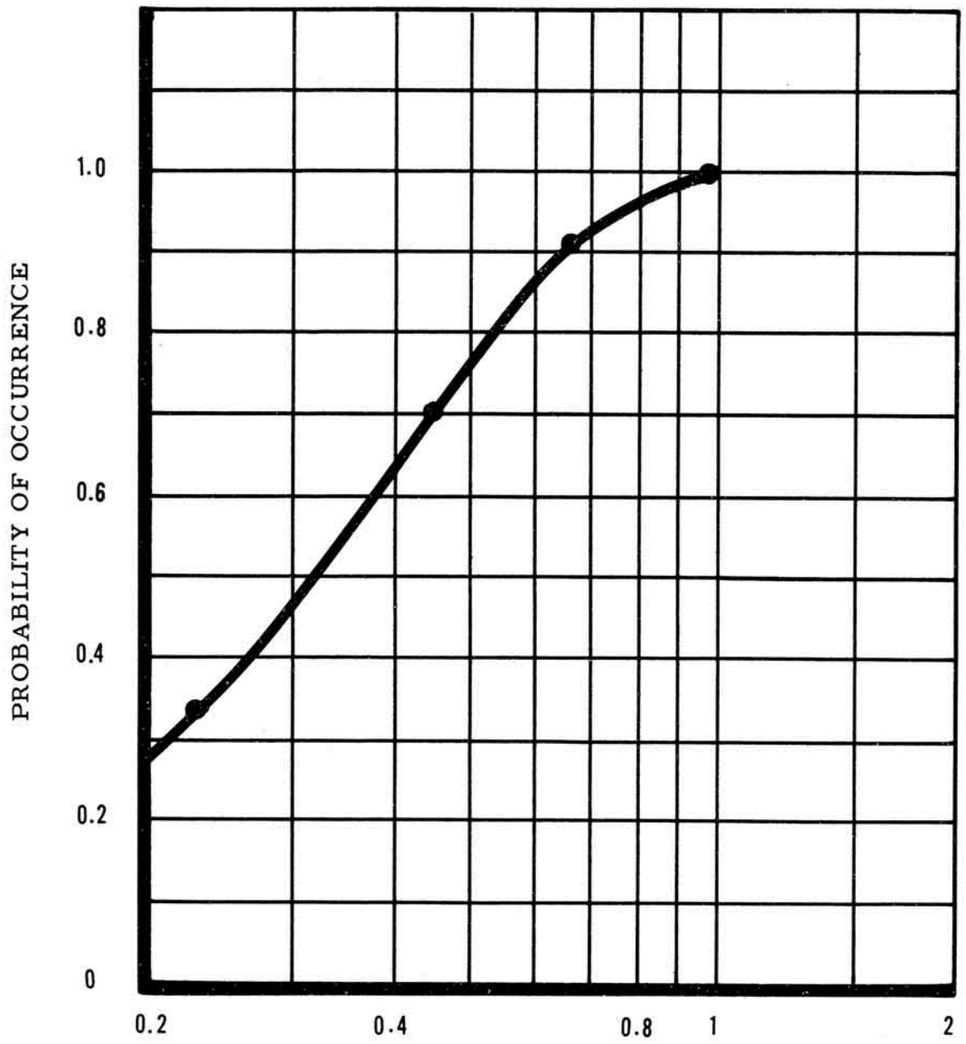
* The coordinates refer to the location of vault no. 6 which houses the 3-component groups of short-period and intermediate band seismometers from which arrival times are determined.



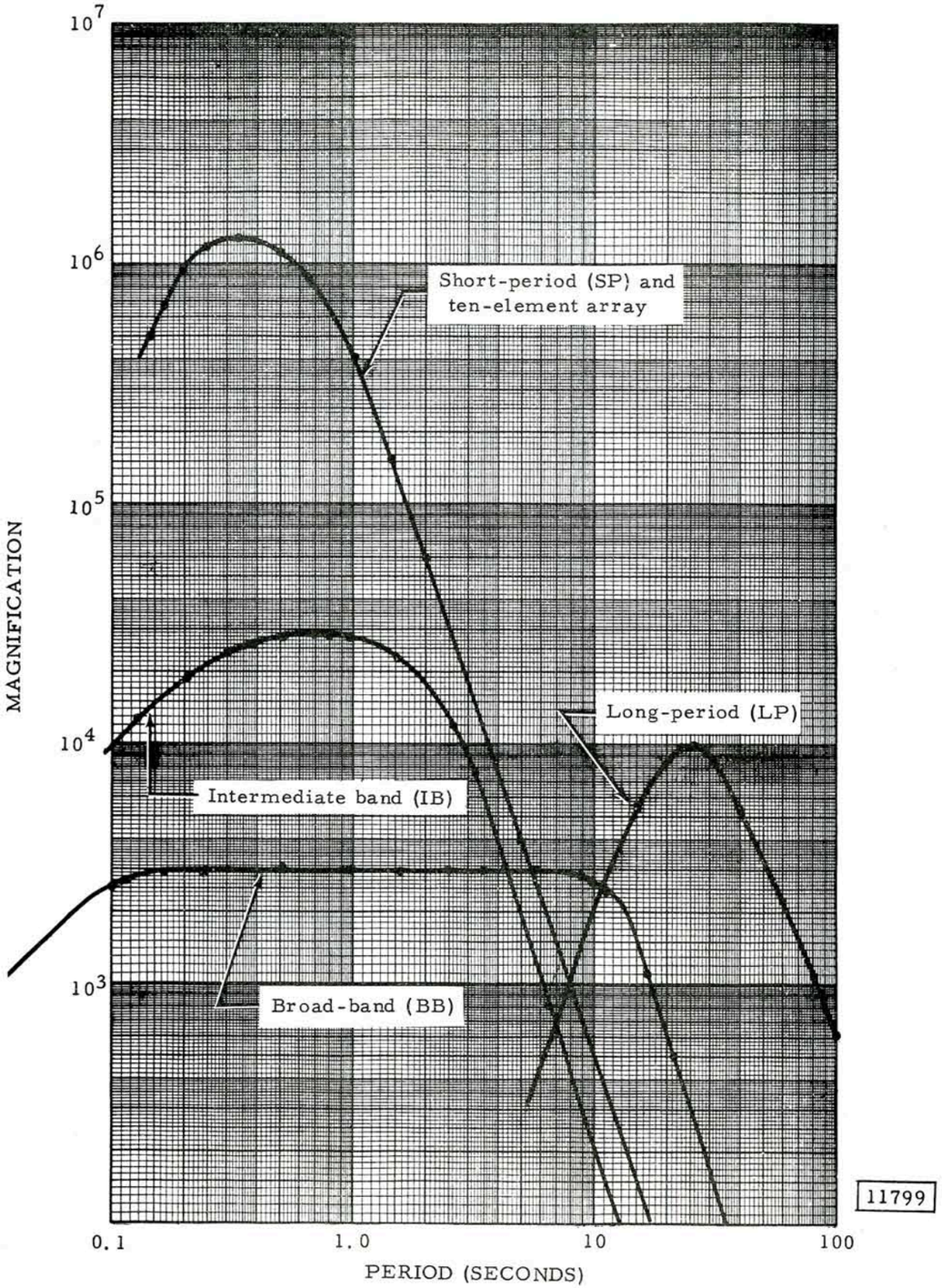
Probability of predominant 0.5-sec microseisms occurring at or less than a given amplitude at Unity magnification

SEISMOGRAPHS

	Ts	λs	Tg	λg	σ^2
SP Vertical Benioff	1.0	1.0	0.2	1.0	0.01
SP Horizontal Benioff	1.0	1.0	0.2	1.0	0.01
IB Vertical Melton	2.5	0.65	0.64	1.5	0.002
IB Horizontal Sprengnether	2.5	0.65	0.64	1.5	0.0005
BB Vertical Press-Ewing	12.5	0.4	0.64	9.0	0.0002
BB Horizontal Sprengnether	12.5	0.4	0.64	9.0	0.0004
LP Vertical Sprengnether	25.0	1.0	30	1.0	0.004
LP Horizontal Sprengnether	25.0	1.0	30	1.0	0.004

SP = Short Period
IB = Intermediate Band
BB = Broad Band
LP = Long Period
Ts = Free Period of seismometer in secs.
λs = Damping constant of seismometer
Tg = Free Period of galvanometer in secs.
λg_2 = Damping constant of galvanometer
σ^2 = Coupling Coefficient

NOTE: Response curves may be found on page 4.



Response characteristics of seismographs

INTERPRETATION OF SYMBOLS

1. Earthquakes Listed

All local (L), near-regional (NR), regional (R), and distant earthquakes (T) are tabulated on the following pages.

2. System

In the column headed "Syst." (system), the seismograph (SP, IB, BB, or LP) and component (Z, N, or E) used to measure arrival time are designated. When no component designation appears, the phase is read from the vertical component. When neither system nor component designation appears, the phase is read from the SP vertical component.

3. Phase

(1) "i" (impetus) preceding a phase designates sudden beginning of the motion. (A designation of "i" in the case of initial P motion indicates a signal-to-noise ratio exceeding about 5/1).
(2) "e" (emersio) designates gradual beginning.
(3) "i" or "e" alone designates an unidentified phase.
(4) ( ) (parenthesis marks) indicate uncertainty.

4. Time

(1) Date and arrival time are given in Greenwich Civil Time (G. C. T.)
(2) The arrival time is reported as the earliest time on Z, N, or E. Single Z rather than the array summation ($\sum$) is used for measuring arrival times on the SP seismographs.

5. Ground Motion

(1) In the columns headed "A" and "T" are tabulated earth displacement in millimicrons and period in seconds, respectively. An amplitude of 999 indicates that a signal cannot be measured reliably. A "c" or "d" in the "A" column indicates compression or dilation, respectively, of the ground as indicated by the vertical component instrument.

The value of "A" for P phases is the maximum amplitude in the first ten seconds. All amplitudes are center-to-peak amplitudes.

(2) Trace amplitudes are measured to the nearest 1/2 millimeter at X10 view.

6. Direction

In the column headed "Dir." (direction), the direction of the epicenter as viewed from WMSO is indicated. For teleseisms, direction is obtained only from P and Rayleigh waves and is listed opposite the phase from which it is obtained. For close events, direction may be obtained from P-wave step-out shown on the individual short-period vertical traces.

7. Type

Earthquakes are identified as either:

L	(local) - - - - - - - - - - -	0°	-	1.4°
NR	(near-regional) - - - - - -	1.4°	-	6°
R	(regional) - - - - - - - -	6°	-	16°
T	(teleseismic) - - - - - - - -	16°	-	180°

8. Remarks Column

(1) Epicentral locations, time of origins, depth of foci, and magnitudes are obtained from the U.S. Coast and Geodetic Survey Preliminary Determination of Epicenters cards.

(2) The nature of the surface waves is indicated subjectively.

(3) Epicentral locations and distances reported by the station are accompanied by an indication of the phases used to determine epicentral distance, e.g. △(S-P) = 6°, Central Colorado.

(4) Operational notes refer to operational difficulties that affect analysis of data.

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
01 Oct		eP	00	55	56.5	2	1.0		T	Strong surface waves on LP
	LPN	eSur	01	12	20					
01 Oct		eP	03	40	17.7	2	0.7		T	Kamchatka
		e			36.6		0.6			55.8 N 161.9 E
										h about 25 km
										0 = 03 29 24.3
01 Oct		eP	11	50	43.4	1	0.9		T	Very emersio
		e		51	00.0		1.0			beginning
		e			09.3		0.9			
01 Oct		eP	15	17	54.5	1	0.3		(R)	Surface wave is Lg.
		e		18	06.3		0.4			△(Lg-P) = 5.5°
		e			13.8		0.5			
	E	eSur		19	26.8		0.5			
01 Oct		e(P)	15	50	11.4	2	1.0		T	
01 Oct		eP	15	54	20.3	1	0.5		NR	△(S-P) = 1.7°
		eS			41.8	999				
01 Oct		eP	19	52	11.1	2	0.8		T	
01 Oct		eP	21	10	48.1	1	1.3		T	
01 Oct		eP	22	43	24.1	1	0.4		NR	△(S-P) = 1.7°
		e			33.8		0.5			
		eS			45.6	999				
01 Oct		eP	23	45	48.0	2	0.7		T	
02 Oct		eP	01	14	13.7	2	1.0		T	
		e			23.1		0.9			
02 Oct		eP	06	07	37.9	1	0.8		T	Off coast of North Island,
		ePP		11	57.9		2.4			New Zealand
										33.9 S 179.6 E
										h about 30 km
										0 = 05 53 37.5

DATE	Syst.	Phase	Arrival Time G.C.T.			Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h.	m.	s.					
02 Oct		eP	06	21	22.0	5	1.3		T	Off coast of North Island, New Zealand 33.8 S 179.6 E h about 85 km 0 = 06 07 40.0
02 Oct		eP'	06	41	02.3	46	1.0		T	Near coast of Java 7.6 S 107.0 E h about 85 km 0 = 06 21 32.8
		e		43	19.1		1.2			
		ePP		44	12.7		3.3			
		e			38.5		1.2			
02 Oct		eP	07	16	37.3	6	1.4		T	Off coast of North Island, New Zealand 33.8 S 179.5 E h about 57 km 0 = 07 02 40.4 Medium surface on LP
		e(PP)		21	01.3		2.8			
		e		24	28.7		0.8			
	LP	eSur		54	13					
02 Oct		eP	07	34	42.9	20	0.9		T	Near coast of Greece 37.2 N 22.2 E h about 72 km 0 = 07 21 49.4
		e		35	14.1		1.0			
	LPN	eS		45	19		20.0			
	LP	eSPP		46	57		32.0			
02 Oct		eP	08	19	07.4	8	0.9		T	Andreanof Islands, Aleutian Islands 51.4 N 179.4 E h about 45 km 0 = 08 09 07.1
02 Oct		eP	08	51	21.3	3	1.1		T	
		e			50.5		1.3			
02 Oct		eP	10	11	19.2	3	1.0		T	
02 Oct		eP	11	20	06.4	2	0.6		T	
		e			37.5		0.7			
		e		21	32.5		1.0			

DATE	Syst.	Phase	Arrival Time G.C.T.			Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h.	m.	s.					
02 Oct		eP	12	16	04.8	3	0.6		R	
		e(Sur)		19	12.5		1.5			
02 Oct		eP	12	26	20.4	2	0.7		T	
02 Oct		eP	13	33	06.6	2	0.9		T	
02 Oct		eP	14	49	57.6	3	1.1		T	
02 Oct		e(P)	15	01	45.2	18	2.0		T	
		e		03	15.8		1.2			
02 Oct		eP	16	52	21.9	3	1.0		T	
02 Oct		eP	20	16	49.4	1	0.8		T	
02 Oct		eP	21	38	12.7	1	0.5		T	Near Chile-Bolivia border 19.4 S 69.0 W h about 25 km 0 = 21 27 59.1
		e(PcP)			56.4		0.9			
02 Oct		eP	21	57	34.3	3	1.0		T	
02 Oct		eP	22	45	13.3	7	1.2		T	
		e		46	46.8		1.2			
03 Oct		eP	01	14	16.8	2	1.0		T	Mediterranean Sea, near Crete 35.4 N 22.7 E h about 44 km 0 = 01 01 13.0
03 Oct		eP	03	52	10.6	1	0.8		T	
03 Oct		eP	06	33	27.0	2	1.4		NR	
	E	eSur		34	26.1		0.7			

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
03 Oct		eP	06	43	39.5	9	0.9	SE	R	Surface at 06 47 24.8 is Lg.
		e			53.5		0.5			△(Lg-P) = 13°
		e		44	10.0		0.7			
		e			17.2		0.7			
		e		45	38.0		0.9			
		e		47	10.4		1.0			
	E	eSur			24.8		1.0			
	E	eSur		48	05.0		1.0			
03 Oct		eP	10	46	55.9	1	0.7		T	
03 Oct		eP	11	56	10.5	2	0.9		T	
03 Oct		eP	12	54	38.0	3	0.7		T	
03 Oct		eP	15	55	41.2	5	0.2		L	△(S-P) = 0.8°
	E	eS			52.4		0.4			
03 Oct		eP	16	14	29.9	5	0.2		L	△(S-P) = 0.6°
	E	eS			39.5		0.6			
03 Oct		eP	16	27	45.3	2	0.2		NR	△(S-P) = 1.7°
	E	eS		28	06.8		0.6			
03 Oct		eP	17	25	10.5	1	0.6		T	
03 Oct	LP	eSur	19	47	42				T	Medium surface waves, Rayleigh type, on LP
03 Oct		eP	23	29	41.6	1	0.2		NR	△(S-P) = 1.7°
	E	eS		30	03.0		0.4			
03 Oct		eP	23	39	26.1	1	0.5		NR	△(S-P) = 1.7°
	E	eS			47.5		0.5			
04 Oct	LP	eSur	00	09	00				T	Mariana Islands region 22.5 N 143.5 E h about 25 km 0 = 23 21 14.8 Medium surface waves, Rayleigh type, on LP.

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
04 Oct		eP	02	25	23.7	4	0.9		T	Orange County, California
		e		26	07.4		1.0			33.8 N 117.8 W
		e		29	40.8		1.0			h about 18 km
	N	eSur			51.5		1.1			0 = 02 21 30.6
	LP	e		31	23		12.0			
04 Oct	LPN	eSKS	02	47	48		16.0		T	New Hebrides Islands region
	LPN	ePS		50	28		22.0			13.2 S 166.5 E
	LP	ePSP		51	20		20.0			h about 66 km
		ePKKP		53	18.2		0.9			0 = 02 23 23.5
		e			41.3		1.0			Strong surface waves, Rayleigh type, on LP.
	LPE	eSS		56	03		27.0			Weak surface on BB.
	LP	e	03	04	00		35.0			
	LPE	e(Sur)		06	00					
	LP	eSur		11	00					
04 Oct		eP	04	41	59.4	4	0.7		T	Near coast of Kamchatka 51.8 N 158.8 E h about 25 km 0 = 04 30 42.7
		e		42	18.6		0.8			
04 Oct	LP	eSur	07	04	20				T	Northern Mariana Islands 22.7 N 143.8 E h about 154 km 0 = 06 14 55.5 Weak surface waves on LP
04 Oct		eP	07	42	11.0	3	0.8		T	Medium surface waves, Rayleigh type, on LP.
	LP	eSur	08	08	25					
04 Oct		eP	08	22	36.0	1	0.7		T	
		e			42.6		0.8			
04 Oct		eP	09	21	22.8	2	0.8		T	
04 Oct		eP	12	19	21.2	1	0.6		T	

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
04 Oct		eP	14	16	19.3	3	1.0		T	
04 Oct		eP	14	22	06.7	2	0.7		T	
04 Oct		eP	17	19	53.3	4	0.7	SW	T	
04 Oct		eP	17	35	20.8	4	0.7		T	
04 Oct		eP	18	02	35.8	2	0.3		NR	△(S-P) = 1.7°
		e			45.8		0.4			
		eS			57.4	999				
04 Oct		eP	20	07	51.8	2	0.8		T	
		e		08	26.5		1.0			
		e		10	30.8		0.8			
04 Oct		eP	20	35	10.5	2	0.2		L	△(S-P) = 0.6°
	E	eS			19.8		0.4			
04 Oct		eP	20	46	54.3	1	0.5		R	Very emersio beginning.
	N	eSur		47	45.4		0.8			
04 Oct		eP	21	42	01.0	2	0.7		T	Tonga Islands region 17.6 S 173.4 W h about 80 km 0 = 21 29 15.0
04 Oct		eP	21	53	04.4	6	1.2		T	
04 Oct		eP	22	15	49.6	2	0.3		NR	△(S-P) = 1.7°
		eS		16	11.0	999				
05 Oct		eP	03	50	29.4	1	0.5		T	
05 Oct	E	eSur	05	49	02.0		1.0		R	
05 Oct		eP	15	21	43.6	6	0.2		L	△(S-P) = 0.6°
	E	eS			53.0		0.3			

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
05 Oct		eP	16	38	37.6	2	0.2		L	△(S-P) = 0.6°
	E	eS			47.1		0.4			
05 Oct		eP	16	42	06.8	3	0.3		L	△(S-P) = 0.6
	E	eS			16.1		0.3			
05 Oct	LPN	e(Sur)	17	42	00				T	
05 Oct		eP	18	22	35.5	13	1.5		T	Loyalty Islands region 19.4 S 169.0 E h about 58 km 0 = 18 08 43.4 Weak surface waves on LP
	LP	eSP		35	48		20.0			
		ePKKP		38	35.5		0.8			
		e			55.6		1.5			
	LP	eSur		57	00					
05 Oct		eP	21	26	11.3	2	0.6		R	
	E	eSur		27	27.0		0.6			
05 Oct		eP	23	04	55.0	2	0.9		T	
05 Oct		eP	23	12	03.0	9	0.6		T	Sea of Okhotsk 51.0 N 149.7 E h about 518 km 0 = 23 01 07.3
		epP		13	55.6		1.1			
05 Oct	LPE	eSur	23	29	00				T	Near coast of Formosa 24.0 N 121.9 E h about 56 km 0 = 22 35 00.8 Medium surface waves, Rayleigh type, on LP.
06 Oct		eP	01	37	18.2	13	1.0		T	Kurile Islands 47.6 N 152.0 E h about 31 km 0 = 01 25 29.3
		e			53.0		0.8			
06 Oct		eP	02	42	20.5	2	0.2		L	△(S-P) = less than 0.1°
	N	iS			24.9	999				

DATE	Syst.	Phase	Arrival Time G.C.T.	Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h. m. s.					
06 Oct		eP	03 32 26.6	3	0.9		T	
06 Oct		eP	07 11 23.8	3	0.8		T	Medium surface waves
	LP	eSur	36 30					on LP
06 Oct		eP	08 06 35.7	9	1.0		T	Near coast of Mexico
	E	eSur	12 25.6		1.8			16.0 N 97.9 W
								h about 32 km
								0 = 08 02 19.1
								Strong surface waves
								on IB and SP
								Weak surface on LP
								and BB
06 Oct		eP	09 12 27.1	2	0.8		T	
06 Oct		eP	11 16 48.2	3	0.8		T	Hokkaido, Japan
		e	17 34.1		1.2			42.4 N 142.1 E
								h about 115 km
								0 = 11 04 22.5
06 Oct		eP	14 39 10.4	2	0.7		T	
06 Oct		eP	16 14 51.0	999			NR	$\triangle$(S-P) = 1.7°
		eS	15 12.4	999				
06 Oct		eP	17 04 18.5	2	0.6		T	
06 Oct		eP	17 14 07.5	2	0.8		T	
06 Oct		eP	17 43 55.0	1	0.8		T	
06 Oct		eP	20 51 31.4	4	1.0		T	
06 Oct		eP	23 28 52.0	2	0.4		NR	$\triangle$(S-P) = 1.7°
	E	eS	29 13.4	999				

DATE	Syst.	Phase	Arrival Time G.C.T.	Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h. m. s.					
07 Oct		eP	00 13 50.8	1	0.4		NR	$\triangle$(S-P) = 3.1°
	E	eS	14 34.8		0.5			
07 Oct		e(Sur)	06 16 20.4		1.2		(R)	
07 Oct		eP	06 43 25.1	2	0.2		L	$\triangle$(S-P) = 0.1°
	N	eS	30.8		0.3			
07 Oct		eP	08 25 19.2	4	1.0		T	Southern Bolivia
		e(pP)	59.8		0.9			21.3 S 67.5 W
		e(PP)	27 33.7		0.9			h about 149 km
		eP'P'	45 01.2		0.7			0 = 08 15 08.0
07 Oct		eP	09 19 41.2	3	0.9		T	
		e	20 14.4		0.9			
		e	41.2		1.0			
07 Oct		eP	09 31 45.8	4	1.0		T	
07 Oct		eP	10 03 17.1	5	0.9		T	Near coast of Ecuador
		e	26.6		1.0			0.4 S 80.2 W
		e	37.3		1.0			h about 48 km
		e(PP)	04 57.0		1.0			0 = 09 55 54.2
		ePcP	05 27.5		0.7			Medium surface waves
	LPN	eS	09 18		18.0			on LP
	LPN	eSS	12 10		22.0			
	LP	eSur	15 45					
07 Oct		eP	13 29 51.6	4	1.3		T	
07 Oct		eP	14 29 40.2	8	0.8	SE	T	
		e	30 04.0		0.8			
		e	34 09.6		0.9			
07 Oct		eP	15 58 47.1	33	1.1	WNW	T	Foreshock of following
		e	54.2		1.0			Oregon event.
		e	59 11.1		0.9			

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
07 Oct		eP	15	59	24.7	46	0.8		T	Off coast of Oregon
		e			31.1		1.0			43.5 N 128.8 W
		e	16	00	57.5		1.9			h about 25 km
	LPE	e		03	17		18.0			0 = 15 54 01.3
	LPE	eS			55		17.0			Strong surface waves,
	BBN	e		04	08		5.5			Rayleigh type, on LP.
	LP	eSur		06	48					Medium surface on BB.
07 Oct		eP	16	05	15.4	8	1.1	WNW	T	Oregon aftershock
		e			21.0		1.3			
07 Oct		eP	16	10	00.8	100	1.4		T	Oregon aftershock
		e			07.2		0.8			
		e		12	20.3		0.9			
07 Oct		eP	17	33	54.4	4	1.0	SE	T	Possible regional with surface intermingled in following event.
07 Oct		eP	17	36	48.0	6	1.0		T	Chile-Bolivia border
		e(PcP)		37	29.8		0.6			20.1 S 68.3 W
		e			40.5		0.7			h about 179 km
		e			58.0		1.4			0 = 17 26 48.8
07 Oct		eP	20	33	35.9	3	1.0		T	
07 Oct		e(Sur)	21	18	24.8		0.9		(T)	
07 Oct		eP	21	46	38.0	1	0.3		NR	Δ(S-P) = 1.8°
	N	eS		47	00.7		0.4			
07 Oct		eP	22	45	48.8	2	0.8		T	
07 Oct		eP	23	30	37.6	1	0.6		T	
08 Oct		eP'	01	12	11.9	1	0.6		T	Ceram
		e			23.0		0.6			3.8 S 128.5 E
										h about 178 km
										0 = 00 53 20.0

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
08 Oct		eP	03	07	07.4	13	1.3		T	Fox Islands
		e			30.0		1.2			Aleutian Islands
		e		08	03.4		1.4			51.6 N 170.9 W
										h about 25 km
										0 = 02 57 49.0
08 Oct		eP	07	25	17.7	1	0.6		T	
08 Oct		eP	08	04	33.4	2	1.0		T	
08 Oct	LP	eSur	12	36	18				T	Solomon Islands region
										9.8 S 160.4 E
										h about 94 km
										0 = 11 45 35
										Weak surface waves,
										Rayleigh type, on LP.
08 Oct		iP	12	52	37.2	d 13	0.8		T	Near coast of Chile
		e(pP)		53	00.6		0.8			29.9 S 71.8 W
		e		55	36.5		1.0			h about 65 km
		eP'P'	13	20	48.6		0.7			0 = 12 41 35.1
08 Oct		eP	17	23	38.3	2	0.6		T	
		e			49.2		0.5			
08 Oct		eP	22	05	37.8	2	0.6		T	Fox Islands, Aleutians
		e			50.9		1.6			53.1 N 166.7 W
		e		06	55.8		1.0			h about 48 km
	LPE	eS		12	46		22.0			0 = 21 56 44.0
	LP N	e(SS)		16	45		20.0			Strong surface waves
	LP	eSur		20	15					on LP.
										Weak surface on BB.

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
09 Oct		eP'	00	00	20.5	26	1.3		T	Halmahera
		e		01	50.8		1.4			1.6 N 127.3 E
		ePP		02	04.0		1.4			h about 102 km
		eSKP		03	45.8		1.6			0 = 23 41 32.2
		ePKKP		10	06.2		0.7			Strong surface waves,
	LPE	e(PS)		12	35		20.0			Love and Rayleigh type,
		e		13	18.6		1.6			on LP.
		eSKKP			51.4		2.2			
	LPE	eSS		19	00		25.0			
	LPN	eSur		33	33					
	LP	eSur		39	42					
09 Oct		eP	00	20	10.0	5	1.0		T	
		e			37.6		0.9			
		e		24	15.3		1.0			
09 Oct		eP	01	50	05.5	2	0.8		T	Tonga Islands region
										21.9 S 175.5 W
										h about 48 km
										0 = 01 36 56.0
09 Oct		eP	03	21	13.6	24	1.3		T	Near south coast of
		e		24	55.0		0.8			Mexico
	E	eSur		25	01.0		1.0			16.1 N 94.0 W
	LP	eSur			10					h about 154 km
	LPN	e		28	25		28.0			0 = 03 16 58.2
										Strong surface waves
										on SP.
										Weak on IB, BB and LP
09 Oct		eP	06	22	47.8	1	0.8		T	
09 Oct		eP	06	35	10.5	1	0.8		T	
09 Oct		eP	10	12	36.8	3	0.6		R	
		e		13	54.5		0.7			
	E	eSur		16	27.0		0.7			

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
09 Oct		eP	11	18	30.8	1	0.8		T	New Hebrides Islands region
										13.2 S 167.8 E
										h about 26 km
										0 = 11 04 45.6
09 Oct		eP	13	08	13.0	6	1.0		T	
09 Oct		eP	14	03	03.6	1	0.4		L	△(S-P) = 0.7°
		e			08.8		0.4			
	E	eS			14.4		0.4			
09 Oct		eP	15	44	23.0	1	0.4		NR	△(S-P) = 2.1°
	E	eS			59.0		0.4			
09 Oct		eP	23	37	55.6	1	0.3		NR	
	E	eSur		38	14.4		0.5			
		e(Sur)		39	07.0		1.5			
10 Oct		epP	03	59	15.6		0.9		T	South of Fiji Islands
		ePP	04	01	10.0		1.7			22.9 S 180.0
										h about 576 km
										0 = 03 44 38.3
10 Oct		eP	04	19	18.0	4	1.1		T	
10 Oct		eP	05	49	49.5	5	1.3		T	
10 Oct		eP	08	39	58.9	1	0.8		T	Solomon Islands region
		e		40	22.8		0.8			5.4 S 154.3 E
		ePP		44	30.0		1.3			h about 154 km
		ePKKP		55	35.1		0.9			0 = 08 25 54.6
10 Oct		eP	09	41	41.2	1	0.9		T	
10 Oct		eP	12	37	16.0	3	0.9		T	

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
10 Oct		eP'	17	43	47.1	2	1.0		T	New Guinea
		ePP		45	11.8		1.5			4.7 S 138.2 E
		e			35.1		1.4			h about 36 km
	LPN	e		52	38		15.0			0 = 17 24 58.9
		ePKKP		54	01.4		0.7			Medium surface waves,
	LPE	ePS		55	05		25.0			Love and Rayleigh type,
		e(SKKP)		57	29.1		1.4			on LP.
	LPE	e	18	02	45		34.0			
	LPE	eSur		20	40					
	LP	eSur		24	05					
10 Oct		eP	18	29	11.1	3	0.9		T	
		e			32.5		0.8			
10 Oct		eP	18	52	03.6	1	0.7		T	
10 Oct		eP	18	56	45.0	16	1.1		T	Fiji Islands region
		e		58	27.2		1.7			16.1 S 176.3 W
										h about 361 km
										0 = 18 44 28.6
10 Oct		eP	20	38	55.9	1	0.6		T	
11 Oct		eP	00	42	59.6	2	0.8		T	Kermadec Islands
	LP	eSur	01	16	58					28.8 S 175.9 W
										h about 88 km
										0 = 00 29 36.4
										Weak surface waves
										on LP
11 Oct		eP	01	42	17.2	2	1.0		T	
11 Oct		eP	02	51	03.9	1	0.5		T	
11 Oct		eP	06	31	46.1	1	0.6		T	South of Samoa
		e			54.3		0.8			15.4 S 172.4 W
										h about 25 km
										0 = 06 19 02.0

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
11 Oct		eP	07	11	57.2	23	1.3		T	Kodiak Island
		e		12	14.2		0.8			57.5 N 154.1 W
		e			21.2		0.7			h about 42 km
		e			41.2		0.8			0 = 07 03 58.6
		ePP		13	33.8		1.3			Medium surface waves
		e			44.6		0.5			on LP
		e		15	22.0		1.4			
		e		16	02.6		1.2			
	LPN	eS		18	15		20.0			
	LPN	eScS		21	51		23.0			
	LPN	eSur		24	07					
11 Oct		eP	07	53	27.6	1	0.7		T	Kazakh, S.S.R.
										50.4 N 77.4 E
										h about 31 km
										0 = 07 40 04.8
11 Oct	LPN	eSur	10	15	15				T	Santa Cruz Islands
										11.6 S 166.3 E
										h about 52 km
										0 = 09 28 17.7
										Medium surface on LP.
11 Oct		eP	12	10	32.1	2	1.1		T	
11 Oct		eP	12	37	34.9	5	1.0		T	Near coast of Peru
		epP			57.2		1.1			13.2 S 75.5 W
		ePcP		38	45.3		0.8			h about 130 km
		e		39	11.5		0.9			0 = 12 28 34.5
11 Oct		eP	13	41	16.1	4	1.2		T	
11 Oct		eP	15	38	16.3	4	0.9		T	
11 Oct		eP	16	02	48.5	2	0.6		NR	$\triangle$(S-P) = 1.7°
		e			57.6		0.4			
		eS		03	10.0	999				

DATE	Syst.	Phase	Arrival Time G.C.T.			Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h.	m.	s.					
11 Oct		eP	16	16	50.0	1	0.7		T	South of Fiji Islands 24.5 S 179.8 E h about 560 km 0 = 16 04 18.0
11 Oct		eP	17	37	44.2	2	0.7		T	
11 Oct		eP	20	02	07.6	3	1.0		T	
11 Oct		eP	20	34	42.4	1	0.3		NR	△(S-P) = 1.7°
	E	eS		35	03.6		0.3			
11 Oct		eP	21	13	00.3	1	0.4		R	
		e			09.1		0.7			
		e			56.3		0.5			
	E	eSur		14	28.9		0.9			
11 Oct		eP	22	13	22.7	1	0.6		NR	△(S-P) = 3.1°
		e			26.5		0.4			
		e			29.6		0.5			
		eS		14	00.4	999				
11 Oct		eP	22	29	09.8	2	0.9		T	
		e			18.6		0.7			
11 Oct		eP	23	36	50.5	1	0.3		NR	△(S-P) = 1.7°
		e		37	00.3		0.4			
	E	eS			12.2		0.5			
12 Oct		eP	02	06	13.4	2	1.1		T	
12 Oct		eP	02	22	55.9	3	1.1		T	
12 Oct		eP	03	16	10.0	3	1.0		T	

DATE	Syst.	Phase	Arrival Time G.C.T.			Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h.	m.	s.					
12 Oct		eP'	04	01	34.7	1	0.8		T	Talaud Islands
		e		02	10.8		0.9			5.4 N 126.0 E
		e			44.8		1.4			h about 124 km
		e		04	23.4		1.5			0 = 03 42 50.9
		e			57.2		1.3			
		ePKKP		11	30.2		0.6			
12 Oct		eP	05	55	30.3	1	0.5		T	Possible new event
		e			53.7		0.9			
12 Oct		eP	06	00	34.6	1	0.8		T	
12 Oct		eP	06	00	48.3	4	0.8	SSE	T	
12 Oct		eP	06	00	50.9	31	1.1	SSE	T	
		e		01	15.7		0.8			
		e		02	03.6		1.3			
		e		03	41.3		1.0			
		e		06	18.7		1.2			
		e			45.9		1.1			
12 Oct		eP'	06	12	34.8	2	0.7		T	Near coast of New Guinea
	LP	eSur		54	10					2.9 S 144.9 E h about 25 km 0 = 06 01 25.5 Strong surface waves, Rayleigh type, on LP.
12 Oct		eP	08	18	29.6	3	1.2		T	
12 Oct		eP	09	05	12.3	7	1.1		T	
12 Oct	LPE	eSur	09	11	40				T	New Britain
	LP	eSur		20	12					5.6 S 151.9 E h about 41 km 0 = 08 24 10.0 Weak surface on LP.

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
12 Oct		eP	14	00	11.5	2	0.7		T	North of Puerto Rico
		e			42.7		1.1			19.1 N 66.0 W
		ePP		01	23.2		1.1			h about 63 km
		e		02	46.0		0.8			0 = 13 53 41.3
	E	eSur		08	17.7		1.1			
12 Oct		eP	14	17	11.8	2	0.7		T	
		e			26.8		0.8			
12 Oct		eP	14	31	04.3	1	0.6		R	Wyoming
	E	eSur		33	31.4		1.0			43.3 N 108.8 W
										h about 25 km
										0 = 14 27 37.9
12 Oct		eP	16	46	38.6	1	0.3		NR	△(S-P) = 1.7°
		e			48.2		0.4			
		eS		47	00.4	999				
12 Oct		eP	16	57	26.6	8	1.3		T	
12 Oct		eP	18	28	41.4	2	0.8		T	Surface may be
		eSur		34	17.2		0.8			separate
12 Oct		eP	19	01	45.2	2	0.8		T	
12 Oct		eP	19	52	15.2	1	0.4		NR	△(S-P) = 4.2°
		e			17.4		0.3			
	E	eS		53	04.0		0.4			
12 Oct		eP	20	11	11.2	4	1.0		T	
		e			28.2		1.3			
12 Oct		eP	21	58	30.2	2	0.5		NR	△(S-P) = 2.7°
	E	eS		59	02.7		0.5			
12 Oct		eP'	22	16	41.3	1	0.7		T	South of Macquarie Island
	LP	eSur		58	00					60.7 S 153.8 E
										h about 25 km
										0 = 21 57 35.0
										Medium surface waves
										on LP

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
13 Oct		eP	00	56	09.6	1	0.6		T	
13 Oct		eP'	02	40	35.1	1	0.5		T	Off south east coast of
		e		41	15.5		1.2			Mindanao, P. I.
		ePKKP		50	39.8		0.7			6.3 N 126.8 E
										h about 60 km
										0 = 02 21 44.6
13 Oct		eP	04	40	03.9	1	0.7		T	
13 Oct		eP	05	13	49.4	2	2.0		T	Sandwich Islands
		e		16	44.8		1.2			55.9 S 27.2 W
		e		17	20.0		1.3			h about 67 km
		eP'			43.0	6	1.1			0 = 04 59 04.8
		ePP		18	19.0		1.6			Mag. 5-1/2 - 5-3/4 (Pal)
		e		19	56.4		1.6			Strong surface waves,
		e		20	23.9		1.4			Rayleigh type, on LP.
	LPE	$eSKS_1$		23	50		22.0			Initial arrival is
	LPE	$eSKS_2$		24	41		25.0			P diffracted.
	BB	eSP		27	25		8.0			Phase at 05 29 22.4
	LP	e			42		22.0			possible new event.
		$ePKKP_1$		28	37.4		0.8			
		$ePKKP_2$			50.6		1.2			
		e		29	22.4		1.6			
		eP'P'		37	07.3		0.6			
	LP	eSur		51	20					
13 Oct		eP	08	20	23.0	2	0.8		T	
13 Oct		eP	11	01	06.8	4	1.2		T	Sandwich Islands region
		e		05	01.6		1.0			60.3 S 34.3 W
	LP	ePP			41		16.0			h about 44 km
	LPE	ePS		15	09		20.0			0 = 10 46 47.7
	LP	eSPP		16	00		22.0			Mag. 5-1/2 - 5-3/4 (Pal)
		ePKKP			36.2		0.9			Strong surface waves,
	LP	eSS		21	03		23.0			Rayleigh type, on LP.
	LP	ePPP		24	40		28.0			
	LP	e(Sur)		36	15					
	LP	eSur		41	52					

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
13 Oct		eP	16	02	16.7	7	1.0	SE	T	
13 Oct		eP	17	41	18.6	24	0.8		T	Tonga Islands region
		epP		42	09.5		0.9			22.0 S 176.9 W
		e			21.7		1.0			h about 155 km
		e		48	34.8		2.0			0 = 17 28 21.5
	LPN	eSKS		51	39		12.0			
	LPN	eS		52	17		20.0			
	LPN	e		53	15		16.0			
	LPN	ePS			33		22.0			
		ePKKP		58	27.2		1.0			
	LPE	eSS			37		21.0			
14 Oct		eP	00	07	31.8	1	0.2		L	△(S-P) = less than 0.1°
		eS			34.4	999				
14 Oct		eP	00	14	09.1	1	0.7		(R)	Very emersio beginning
		e		15	35.4		0.9			
	E	eSur		16	13.4		1.0			
14 Oct		eP	12	57	38.8	3	1.0		T	
		e			47.8		1.0			
14 Oct		eP	15	09	24.2	2	0.7		T	
14 Oct		eP	16	27	45.3	2	1.0		T	New Hebrides Islands 19.1 S 168.4 E h about 28 km 0 = 16 13 48.7
14 Oct		eP	18	11	53.7	3	0.7	SE	NR	△(S-P) = 1.8°
	E	eS		12	15.8		0.7			
14 Oct		eP	19	23	21.2	2	0.9		T	
		e			41.0		0.7			
14 Oct		eP	20	36	26.9	1	0.7		T	

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
14 Oct		eP	21	25	37.8	2	0.6		T	Near coast of Ecuador
		e			47.6		0.8			0.9 S 80.3 W
		ePcP		27	43.8		0.6			h about 25 km
		e			54.7		0.8			0 = 21 18 57.4
14 Oct		eP	22	10	06.8	6	0.7		T	Kamchatka
		e(PcP)			26.6		0.6			51.1 N 159.1 E
		e			55.7		0.7			h about 80 km
		e		11	12.0		1.2			0 = 21 58 57.4
		e			24.0		0.8			Medium surface waves
		e			44.5		0.8			on LP
	LPN	eS		19	22		13.0			
	LPN	e(Sur)		27	53					
	LPN	eSur		34	24					
14 Oct		eP	22	57	24.6	2	0.8		T	
15 Oct		eP	02	52	54.6	4	0.8		T	Possible regional
		e		53	01.1		0.5			
		e			05.1		0.6	SE		
		e			10.3		0.7			
		e			15.1		0.8			
		e(Sur)		56	58.1		1.0			
		e(Sur)		57	30.5		0.8			
15 Oct		eP	04	01	29.0	1	0.7		T	
		e			53.0		1.0			
15 Oct		eP	04	14	37.8	1	0.7		T	
15 Oct		eP	07	51	42.1	1	0.9		T	
15 Oct		eP	09	02	15.4	3	0.7		T	
		e			24.5		0.9			
		e			37.3		0.9	SE		
		e		03	06.0		1.0			
		e		04	25.9		1.0			

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
15 Oct		eP	17	25	28.7	2	0.8		T	
		e			43.7		0.7			
15 Oct		iP'	17	27	24.3	d 16	0.8		T	Near southwest coast
		e		30	41.8		1.9			of Sumatra
										4.1 S 102.3 E
										h about 66 km
										0 = 17 07 55.6
15 Oct		eP	17	42	14.0	3	0.8		T	
15 Oct		eP	21	07	45.7	3	1.1		R	Central Utah
		e			54.9		1.1			39.3 N 111.5 W
		e		08	26.1		0.8			h about 25 km
	N	eSur		10	52.1		0.9			0 = 21 05 00.1
										Surface wave is Lg.
15 Oct		eP	21	39	43.2	3	0.9		T	
15 Oct		eP	22	17	06.3	2	0.8		T	
		e			27.1		0.9			
16 Oct		eP	01	18	27.2	12	0.7		T	Kamchatka
		e(pP)			40.2		0.7			50.9 N 157.9 E
										h about 44 km
										0 = 01 07 08.2
16 Oct		eP	01	40	28.7	1	0.5		T	
		e			34.4		0.9			
16 Oct		eP	02	17	22.6	4	1.0		T	Aleutian Islands,
		e			33.6		0.7			Fox Islands
		e			45.0		0.7			53.0 N 168.3 W
										h about 60 km
										0 = 02 08 21.0
16 Oct		eP	03	40	25.6	1	0.7		T	Tonga Islands region
										19.9 S 176.1 W
										h about 224 km
										0 = 03 27 44.1

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
16 Oct		eP	04	14	18.0	2	1.0		T	
16 Oct		eP	04	25	36.2	3	1.0		T	
16 Oct		eP	08	17	25.6	1	0.7		T	
16 Oct		eP	09	16	09.8	3	0.7		T	
		e			24.3		0.7			
16 Oct		eP	11	54	43.2	10	1.2		T	Off coast of central
		e(pP)			52.2		1.4			Chile
										38.3 S 74.4 W
										h about 25 km
										0 = 11 42 56.1
16 Oct		eP	18	02	54.1	1	0.4		NR	$\triangle$(S-P) = 1.8°
		e		03	03.5		0.3			
		e			05.0		0.3			
	E	eS			16.3		0.4			
	E	e			17.2		0.4			
	E	e			19.2	999				
16 Oct		eP	18	15	46.2	1	0.4		NR	$\triangle$(S-P) = 1.7°
		e			48.2		0.3			
		e			50.7		0.3			
	E	eS		16	07.7	999				
16 Oct		eP	18	36	22.8	3	1.0		T	
16 Oct		eP	19	15	53.4	1	0.4		R	Central Utah
		e		16	32.5		0.6			39.2 N 111.5 W
	E	eSur		18	58.6		1.0			h about 18 km
										0 = 19 13 06.5
										Surface is Lg.
16 Oct		eP	20	23	58.8	6	0.5	NW	R	[$\triangle$(S-P) = 13.5°]
		e		24	10.4		0.4			
	E	e(S)		26	28.4		0.5			
		e			31.0		0.6			

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
16 Oct		eP	20	40	06.2	1	1.0		T	
		e			23.1		1.0			
16 Oct		eP	20	57	14.0	1	0.3		NR	△(S-P & Lg-P) = 3.2°
		e			17.5		0.3			Surface is Lg.
		e			19.8		0.5			
	N	eS			55.0		0.6			
	N	eSur		58	03.1		0.7			
		e			04.8		0.7			
16 Oct		eP	21	29	24.8	1	0.4		NR	△(S-P) = 1.7°
		e			37.1		0.3			
	E	eS			46.5	999				
16 Oct		eP	22	48	01.9	2	1.1		T	
16 Oct		eP	23	32	52.2	1	0.3		NR	△(S-P) = 1.7°
		eS		33	13.6	999				
17 Oct		eP	00	26	38.2	2	0.8		T	Near coast of Peru
		e			41.0		0.8			13.7 S 76.1 W
										h about 42 km
										0 = 00 16 16.7
17 Oct		eP	01	02	35.9	1	0.6		R	Central Utah
		e		03	10.7		0.8			39.2 N 111.5 W
		e			16.0		0.8			h about 21 km
	E	e			24.4		1.0			0 = 00 59 41.8
		e			53.5		1.0			Surface is Lg.
	E	eSur		05	28.9		1.4			
17 Oct		eP	03	58	11.2	1	0.8		R	Northern Utah
	E	eSur	04	00	36.0		1.5			40.0 N 112.5 W
										h about 28 km
										0 = 03 54 46.7
										Surface is Lg.
17 Oct		eP	04	08	09.3	1	0.9		T	

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
17 Oct		eP'	04	46	28.8	3	1.0		T	Bouvet Islands region
		e		47	41.0		1.2			55.8 S 0.5 E
	LPE	eSKKS		55	07		15.0			h about 25 km
	LPE	ePS		57	59		20.0			0 = 04 27 33.5
	LPE	ePPS	05	00	17		23.0			Strong surface waves,
	LPE	e(SS)		04	19		24.0			Love and Rayleigh type,
	LPN	e		12	40		23.0			on LP.
	LPN	eSur		22	00					
	LP	eSur		27	40					
17 Oct		eP	07	23	28.0	2	1.2		T	
17 Oct		eP	09	16	31.0	1	1.0		T	
17 Oct		eP	09	20	32.4	2	1.0		T	
17 Oct		eP	11	42	12.9	1	1.0		T	
17 Oct	LPN	eSur	11	46	15				T	South of Guam
	LPN	eSur		51	40					12.1 N 143.4 E
										h about 25 km
										0 = 11 02 32.7
										Strong surface waves
										on LP
17 Oct		eP	12	01	42.8	2	0.7		T	
17 Oct		eP	12	45	02.3	1	0.8		T	
17 Oct		eP	14	23	16.4	2	0.4	WNW	NR	△(S-P) = 2.0°
		e			19.0		0.5			
		e			23.7		0.4			
	N	eS			41.4		0.6			
17 Oct		eP	15	47	41.0	1	0.7		T	
17 Oct		eP	16	12	46.4	4	1.2		T	
17 Oct		eP	16	25	06.5	2	0.7		T	

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
17 Oct		eP	23	03	21.6	4	0.6	E	NR	△(S-P) = 1.7°
		e			23.0		0.4			
		e			31.6		0.4			
		eS			42.7	999				
		e			45.7	999				
17 Oct		eP	23	47	17.2	1	0.3	SW	NR	△(S-P) = 2.6°
	E	eS			49.2		0.5			
	E	e			50.3		0.5			
18 Oct		eP	00	16	14.1	1	0.6		T	
		e			29.5		0.9			
		e			40.5		0.9			
18 Oct		eP	02	07	27.2	1	0.6		T	
18 Oct		eP	03	03	33.0	2	0.7		T	Kermadec Islands
		e			50.4		0.8			29.9 S 177.6 W
		e		06	31.6		1.0			h about 65 km
		ePKKP		20	03.2		0.6			0 = 02 49 59.6
		e			30.0		0.9			Strong surface waves,
	LPN	e		22	00		15.0			Rayleigh type, on LP.
		e			12.7		0.7			
	LP	eSur		36	00					
18 Oct		eP	03	29	58.2	1	0.6		T	
		e		30	08.2		0.7			
18 Oct		eP	04	08	49.6	1	0.7		T	Fiji Islands region
										20.0 S 177.7 W
										h about 519 km
										0 = 03 56 30.1
18 Oct		eP	06	51	19.4	5	0.6		T	Tonga Islands
										15.1 S 173.9 W
										h about 91 km
										0 = 06 38 43.8

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
18 Oct		eP	07	43	50.9	2	0.8		T	Fiji Islands region
										17.4 S 178.6 W
										h about 576 km
										0 = 07 31 39.3
18 Oct		eP	08	06	26.1	2	1.0		T	
18 Oct		eP	08	07	50.7	4	0.7		T	
18 Oct		eP	10	53	00.0	21	1.4		T	Fox Islands, Aleutians
		ePcP		54	21.3		0.6			53.6 N 165.6 W
	LP	eSur	11	10	00					h about 47 km
										0 = 10 44 10.7
										Weak surface waves,
										Rayleigh type, on LP.
18 Oct		e(P)	12	10	40.1	6	1.4		T	
18 Oct		e(P)	13	13	05.9	6	1.4		T	
18 Oct		eP	13	19	02.3	1	0.6		T	
18 Oct		iP	17	03	35.0	c 427	1.4		T	Near coast of southern
		e			38.5		1.4			Chile
	LPN	eS		13	10		19.0			36.7 S 72.6 W
	LPN	eSur		23	00					h about 67 km
	LP	eSur		27	00					0 = 16 52 00.2
		eP'P'		31	00.8		1.0			Strong surface waves,
		e			10.9		1.2			Love and Rayleigh type,
										on LP and BB.
										Weak surface waves
										on SP and IB.
										Mag. 6-1/2 (Pas)
18 Oct		eP	17	22	08.9	1	0.8		T	
18 Oct		eP	17	23	31.2	5	1.1		T	Possible phases of
		e			44.2		1.1			previous event.
		e			59.0		1.5			
		e		24	36.1		1.1			
		e		25	15.0		1.0			

DATE	Syst.	Phase	Arrival Time G.C.T.	Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h. m. s.					
18 Oct		eP	17 27 42.8	10	1.4		T	
18 Oct		eP	17 40 13.3	7	1.4		T	
18 Oct		eP	17 42 25.0	6	1.3		T	
		e	30.0		1.3			
		e	45 35.0		1.4			
18 Oct		eP	17 50 47.8	13	1.6		T	
18 Oct		eP	18 19 08.5	4	1.2		T	
18 Oct		eP	18 22 08.0	42	1.4		T	Near coast of central Chile
	E	eS	31 43.0		2.2			36.9 S 73.5 W
								h about 55 km
								0 = 18 10 30.4
18 Oct		eP	18 44 50.4	2	0.5		R	[△(S-P) = 3.9°]
	E	e(S)	45 36.5		0.5			
		eSur	46 08.4		0.6			
18 Oct		e(P)	18 49 30.0	1	0.7		T	
18 Oct		eP	19 41 11.2	2	1.0		T	
18 Oct		eP	22 05 58.4	6	0.8	(SE)	T	
18 Oct		eP	22 12 05.2	1	0.6		R	△(S-P) = 5.9°
	E	eS	13 12.1		0.4			
	E	e	59.0		0.9			
		eSur	14 06.5		1.0			
19 Oct		eP	01 22 21.4	1	0.7		T	
19 Oct		eP	02 53 02.9	2	0.6		T	
19 Oct		eP	03 41 41.3	3	0.7		T	

DATE	Syst.	Phase	Arrival Time G.C.T.	Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h. m. s.					
19 Oct		eP	03 53 06.3	29	0.7	SSE	T	
		e	21.0		0.7			
19 Oct		eP	05 13 30.0	6	1.0		R	Southern California
		e	37.0		1.2			35.8 N 117.9 W
		e	14 34.5		1.1			h about 22 km
		e	43.0		1.0			0 = 05 09 44.0
		e	15 01.4		1.0			Strong surface waves
	LPN	eSS	16 38		23.0			on all systems.
	LPN	eSur	17 59					Mag. 5.3 (Pas)
19 Oct		eP	06 02 08.5	2	0.4		NR	Surface is Lg.
		eSur	03 11.5	999				△(Lg-P) = 4.0°
19 Oct		eP	08 43 06.0	14	1.4		T	Near coast of central
	LPN	eS	52 40		18.0			Chile
	LP	eSur	09 03 15					36.9 S 72.7 W
								h about 61 km
								0 = 08 31 29.3
								Weak surface waves,
								Rayleigh type, on LP.
19 Oct		eP'	09 31 37.2	11	1.5		T	West of Macquarie Island
	LP	eSur	10 15 45					55.2 S 146.0 E
								h about 86 km
								0 = 09 12 28.5
								Weak surface waves,
								Rayleigh type, on LP.
19 Oct		eP	10 57 13.5	2	0.7		T	
19 Oct		eP	11 09 13.0	3	0.6		T	Sea of Japan
								43.0 N 139.2 E
								h about 242 km
								0 = 10 56 53.6
19 Oct		eP	11 18 54.5	1	0.6		T	

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
19 Oct		eP	11	30	51.4	999			T	Neuquen Province, Argentina
		epP		31	35.4	999				
		e		33	33.9		1.0			37.1 S 69.8 W
		e			49.9		1.0			h about 155 km
	LP	ePP		34	10		21.0			0 = 11 19 19.6
	LPN	eS		40	22		19.0			Mag. = 6-1/4 (Pas)
	LPN	ePS		41	10		20.0			Strong surface waves,
	LPN	eSur		51	10					Love and Rayleigh type,
	LP	eSur		52	30					on LP.
19 Oct		eP	15	34	16.2	1	0.7		T	
19 Oct		eP	18	02	22.8	1	0.4		NR	△(S-P) = 1.6°
	E	eS			43.7		0.4			
	E	e			45.2		0.3			
	N	e			46.5		0.5			
19 Oct		eP	18	16	32.7	1	0.3		NR	△(S-P) = 1.5°
		e			33.8		0.6			
		e			42.3		0.5			
		eS			54.0	999				
19 Oct		eP	18	22	23.9	3	1.0		T	
19 Oct		eP	19	32	13.7	1	0.6		T	
19 Oct		eP'	19	45	43.5	70	1.5		T	South of Australia
		epP'		46	01.7		1.2			55.3 S 146.4 E
		e			18.8		1.0			h about 50 km
	N	ePKS		49	08.8		2.6			0 = 19 26 32.2
		ePcSP'		57	31.4		1.2			Medium surface waves,
	LPE	eSur	20	21	00					Love and Rayleigh type,
	LP	eSur		28	15					on LP.
19 Oct		eP	20	10	26.9	4	1.0		T	

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
19 Oct		eP	20	21	56.4	2	0.6		NR	△(S-P) = 3.2°
		e		22	00.5		0.4			Surface is Lg.
	E	e			03.8		0.5			△(Lg-P) = 3.3°
		e			32.8		0.4			
	E	eS			34.7		0.4			
	E	eSur			47.5		0.4			
19 Oct		eP	20	37	36.8	2	0.7		T	Tonga Islands
	LP	eSur	21	08	00					17.6 S 174.0 W
										h about 25 km
										0 = 20 24 41.9
										Weak surface on LP.
19 Oct		eP	22	13	30.3	1	0.5		NR	△(S-P) = 4.1°
	E	eS		14	18.0		0.5			Surface is Lg.
		eSur			47.2		0.6			△(Lg-P) = 4.7°
19 Oct		eP	23	58	03.0	8	0.7	N	L	△(S-P) = less than 0.1°
	E	e			04.9		0.5			
		eS			06.7	999				
20 Oct		eP	00	10	04.8	1	0.6		T	
20 Oct		eP	00	43	22.9	2	0.6		T	
20 Oct		eP	01	58	15.1	2	1.0		T	
20 Oct		eP	03	18	00.9	3	1.0		T	
20 Oct		eP	04	48	50.6	3	1.1		T	
20 Oct		eP	05	50	22.6	1	0.5		T	Andreanof Islands,
		e			34.8		0.9			Aleutian Islands
										51.8 N 176.0 W
										h about 36 km
										0 = 05 40 44.1
20 Oct		eP	08	00	07.9	12	1.4		T	Weak surface waves
	LP	eSur		26	15					on LP.

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
20 Oct		eP	08	18	17.6	4	0.8	N	T	Medium surface waves on LP
	LPN	eSur		43	05					
20 Oct		eP	16	57	02.5	4	1.0		T	
20 Oct		eP	19	13	57.8	1	0.7		T	Off coast of central Chile 36.7 S 74.2 W h about 25 km 0 = 19 02 14.5
20 Oct		eP	19	38	56.1	2	0.9		T	
20 Oct		eP	19	53	47.0	3	1.0		R	Orange County, California
	N	eSur		58	19.2		3.2			33.6 N 118.0 W
	LPN	eSur			25					h about 17 km 0 = 19 49 50.5 Mag. 4.6 (Pas) Strong Lg type surface waves on all systems at 19 58 19.2
20 Oct		eP	20	13	15.1	1	0.5		T	
20 Oct	LPN	eSur	20	16	00				R	Orange County, California 33.7 N 118.0 W h about 20 km 0 = 20 07 14.8 Mag. 4.2 (Pas) Weak surface waves on LP
20 Oct		eP	22	39	11.8	2	0.5		R	Orange County, California
		e			26.9		0.9			33.7 N 118.0 W
	LPN	eSur		44	00					h about 27 km 0 = 22 35 34.2 Mag. 4.2 (Pas) Weak surface waves on LP
21 Oct		eP	01	55	11.5	2	0.6	N	T	

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
21 Oct		eP	03	36	42.0	2	1.0		T	
21 Oct		eP	07	58	14.8	1	0.6		T	
21 Oct		eP	08	40	05.5	2	0.8		T	
21 Oct		iP	11	55	51.0	c 26	0.9		T	Fiji Islands
	LPN	eSKS	12	05	30		15.0			18.0 S 178.5 W
	LPN	eS		06	16					h about 618 km 0 = 11 43 41.3
21 Oct		eP	11	59	39.7	5	0.9		T	
21 Oct		eP	12	13	04.8	3	0.6		T	Possible PKKP of 11 55 51.0
21 Oct		eP	16	08	43.8	2	0.6		T	
		e			45.9		0.7	SSE		
		e			53.3		0.8			
21 Oct		eP	17	48	02.5	2	0.6		T	Santa Cruz Islands
		ePKKP	18	04	19.5		0.7			10.8 S 166.0 E
		e			44.6		1.0			h about 192 km 0 = 17 34 36.8
21 Oct		eP	21	07	28.5	1	0.5		L	$\triangle$(S-P) = 1.4°
	N	eS			46.5		0.8			
21 Oct		eP	22	31	33.5	1	0.6		T	Andreanof Islands, Aleutian Islands
		e			46.4		0.8			51.6 N 176.0 W
		e		32	50.0		0.8			h about 35 km 0 = 22 21 52.2
21 Oct		eP	23	11	01.0	2	0.8		T	
21 Oct		eP	23	35	09.5	1	0.4		NR	$\triangle$(S-P) = 1.7°
	E	eS			30.5	999				
22 Oct		eP	00	07	14.8	1	0.8		T	

DATE	Syst.	Phase	Arrival Time G.C.T.			Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h.	m.	s.					
22 Oct		eP	01	16	12.7	1	0.6		T	
22 Oct		eP	06	21	35.8	2	0.7		T	
22 Oct		eP	07	08	30.9	10	0.9		T	West of Galapagos Islands
	LPN	eS		13	49		15.0			0.2 S 94.6 W
	LPN	e		15	19		15.0			h about 60 km
	LP	eSur		17	55					0 = 07 01 42.1
										Strong surface waves, Rayleigh type, on LP.
22 Oct		eP	09	50	56.0	2	0.8		T	
22 Oct		eP	10	04	10.5	6	1.3		T	New Hebrides Islands
	LPN	eSKS		14	55		13.0			19.9 S 172.4 E
	LPN	e		16	20		10.0			h about 181 km
	LP	eSP		17	21		19.0			0 = 09 50 43.6
	LP	eSPP		18	14		19.0			Mag. 5-1/2 (Berk)
	LPN	e		20	05		18.0			Strong surface waves,
	LPN	eSS		22	39		27.0			Love and Rayleigh type,
	LPN	eSSS		26	20		35.0			on LP and BB.
	LPN	e		30	00		27.0			
	LPE	eSur		32	30					
	LP	eSur		36	56					
22 Oct	LP	eSur	11	58	30				T	Strong surface waves, Rayleigh type, on LP.
22 Oct		eP	12	23	46.0	5	0.7	SSE	T	
		e			56.4		0.6			
22 Oct		eP	13	14	35.3	13	1.0		T	West of Galapagos Islands
		e			41.8		0.8			2.2 N 95.9 W
	LP	ePP		15	45		19.0			h about 65 km
		ePcP		17	27.4		1.0			0 = 13 06 31.1
	LP	e		19	18		14.0			Strong surface waves,
	LPN	eS			44		18.0			Rayleigh type, on LP.
	LPN	ePcS		21	22		17.0			Medium surface on BB.
	LP	eSur		23	45					

DATE	Syst.	Phase	Arrival Time G.C.T.			Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h.	m.	s.					
22 Oct		eP	13	20	58.0	6	0.9	SSE	T	
		e		21	04.1		1.0			
22 Oct		eP	13	28	12.6	2	0.8		T	
		e			22.6		1.0			
22 Oct		eP	14	35	21.0	2	0.7		T	
		e			24.9		0.9			
22 Oct		eP	14	53	14.0	6	0.8		T	Fiji Islands
										17.6 S 179.6 W
										h about 549 km
										0 = 14 40 56.6
22 Oct		eP	15	19	09.1	3	0.5		T	Off west coast of
		e			11.7		0.6			Costa Rica
		e			19.3		0.8			10.5 N 86.6 W
	LPE	eS		24	00		20.0			h about 51 km
	LP	eSur		28	30					0 = 15 13 32.3
										Medium surface waves, Rayleigh type, on LP.
22 Oct		eP	19	14	23.9	2	0.8		T	
22 Oct		eP	19	18	36.0	5	1.1		T	
	LPN	e(Sur)		36	35					
23 Oct		eP	00	23	02.0	4	1.0		T	Sandwich Islands region
		e			50.0		1.2			60.4 S 33.4 W
		eP'		27	16.0	20	3.0			h about 25 km
	LPE	ePP			35		23.0			0 = 00 08 33.3
	LPE	eSKS		33	40		22.0			Initial arrival is
	LPN	eS		35	00		15.0			P diffracted.
	LPE	ePS		36	46		25.0			Strong surface waves,
	LPE	ePPS		37	47		32.0			Love and Rayleigh type,
		$ePKKP_1$		38	18.0		0.8			on LP.
		$ePKKP_2$			31.7		0.8			Medium surface on BB.
		$ePKKP_3$			43.4		1.0			
		eSKKP		42	26.5		2.0			
	LPE	eSS			50		25.0			

(continued on next page)

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
	LPE	e		46	30		25.0			(continued from
	LPN	e(PKPPKS)		50	07		27.0			preceding page)
	LPN	e(PKPSKS)		53	30		33.0			
	LPE	eSur		58	00					
	LP	eSur	01	01	00					
23 Oct		eP	01	34	53.2	3	0.6		T	Chile
		e(PcP)		35	15.5		0.7			28.9 S 70.5 W
		epP			25.0		0.7			h about 125 km
		e			42.4		0.6			0 = 01 24 00.6
23 Oct		eP	03	09	52.8	2	0.8		T	
23 Oct		eP	04	36	15.0	1	0.6		T	
23 Oct		eP	06	13	22.2	1	0.7		T	
23 Oct		eP	08	02	53.0	3	1.1		T	
		e		03	07.5		1.6			
23 Oct		eP	08	03	44.3	2	0.6		T	Unimak Island,
										Aleutian Islands
										54.0 N 163.8 W
										h about 35 km
										0 = 07 54 58.9
23 Oct		eP	08	42	37.1	7	0.9		T	△(S-P and SS-P) = 71°
	LPN	eS		51	45		20.0			Strong surface waves,
	LPN	eSS		56	30		28.0			Rayleigh type, on LP.
	LP	eSur	09	03	45					
23 Oct		eP	09	10	34.9	3	1.0		T	
23 Oct		eP	09	18	04.0	2	0.7		T	
23 Oct		eP	09	19	56.0	2	0.7		T	
23 Oct		eP	09	33	05.6	4	1.2		T	

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
23 Oct		eP	10	42	22.1	22	0.7	NNW	T	
		e			48.3		0.8			
23 Oct		eP	11	02	50.7	8	1.0		T	
23 Oct		eP	11	05	53.2	13	1.0		T	
		e		06	04.0		0.9			
23 Oct		eP	12	03	05.8	6	1.0		T	
23 Oct		eP	14	55	38.5	3	1.0		T	Molucca Passage
		eP'		58	11.5	52	1.7			3.5 N 126.4 E
		e			31.1		1.2			h about 25 km
		ePP	15	00	10.2		2.2			0 = 14 39 33.5
	LPE	ePKS		01	50		26.0			Mag. 6-1/2 (Pas)
	LPE	eSKS		05	35		23.0			6-1/4 (Berk)
	LPE	eSKKS		07	07		23.0			Strong surface waves,
	LPN	e			52		18.0			Love and Rayleigh type,
		$ePKKP_1$		08	26.3		1.0			on LP.
		$ePKKP_2$			35.5		0.8			Medium surface on BB.
	LPE	ePS		09	45		28.0			Initial arrival is
	LPE	eSS		16	10		26.0			P diffracted.
	LPN	eSPS			34		20.0			
	LPE	e		17	41		28.0			
	LPE	eSSS		21	05		28.0			
	LPN	e(PKPSKS)		24	19		21.0			
	LPN	eSur		30	00					
	LPE	eSur		37	35					
23 Oct		eP'	15	11	26.0	14	1.4		T	Molucca Passage
		e			54.4		1.0			3.5 N 126.6 E
		e		12	22.5		1.0			h about 32 km
		e(PKKP)		21	18.5		1.0			0 = 14 52 28.2
		$ePKKP_1$			31.5		0.9			
		$ePKKP_2$			58.6		0.9			
23 Oct		eP	16	09	34.4	1	0.7		T	
23 Oct		eP	16	10	27.4	5	1.2		T	

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
23 Oct		eP	17	24	42.2	14	1.0		T	Tonga Islands region
		e		25	07.0		0.9			16.8 S 173.6 W
		e			15.6		0.8			h about 49 km
										0 = 17 11 55.3
23 Oct		eP	18	09	41.3	1	0.3		NR	△(S-P) = 1.7°
		e		10	02.9		0.4			
		eS			03.3	999				
23 Oct		eP	18	30	23.1	3	1.0		T	
23 Oct		eP	19	33	13.4	1	0.8		T	Fiji Islands region
										20.1 S 177.9 W
										h about 553 km
										0 = 19 20 55.7
23 Oct		eP	20	43	47.6	3	0.8		T	
		e			58.0		1.0			
23 Oct		eP	22	44	26.3	1	0.7		R	
	E	eSur		47	33.5		0.7			
23 Oct		eP	23	54	14.0	2	0.4		NR	△(S-P) = 1.7°
		e			23.5		0.4			
		eS			35.4	999				
24 Oct		eP	00	30	48.7	3	0.9		T	Hokkaido, Japan
										42.9 N 144.6 E
										h about 14 km
										0 = 00 18 18.6
24 Oct		eP	00	48	21.7	2	1.0		T	
		e		49	38.9		1.3			
24 Oct		eP	03	16	56.9	2	0.6		T	
24 Oct		eP	04	41	22.8	4	1.0		T	

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
24 Oct		eP	05	23	06.9	1	0.7		T	
		e			30.0		0.8			
24 Oct		eP	05	39	54.2	3	1.0		T	
24 Oct		iP	07	37	28.5	c 28	1.0		T	Off north coast of
		epP			57.6		0.8			Hokkaido, Japan
		e		40	01.9		0.9			45.0 N 146.4 E
		e			21.5		0.9			h about 82 km
		e			40.8		1.1			0 = 07 25 19.9
	LPN	eS		47	30		17.0			
	LPN	ePS		48	15		14.0			
	LPN	e		52	16		11.0			
	LPN	eSS			52		13.0			
	LPN	e		53	38		14.0			
	LP	e(Sur)	08	01	50					
24 Oct		eP	07	46	33.0	7	1.5		T	
24 Oct		eP	07	49	32.3	20	1.3		T	Fiji Islands region
	LPN	eS		59	49		21.0			16.5 S 178.3 E
	LPN	e(Sur)	08	20	55					h about 40 km
										0 = 07 36 17.1
24 Oct		eP'	15	49	06.9	17	1.4		T	Northern Celebes
										0.3 N 123.9 E
										h about 130 km
										0 = 15 30 11.9
24 Oct		eP	16	04	38.5	3	1.0		T	
24 Oct		eP	17	36	03.7	3	1.0		T	
		e			30.9		0.8			
24 Oct		eP	20	46	08.6	2	0.9		T	
24 Oct		eP	22	36	35.9	1	0.5		NR	△(S-P) = 2.5°
	E	eS		37	06.2		0.6			

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
24 Oct		eP	22	39	44.9	9	1.3		T	Near coast of Chile
		e			52.3		1.3			38.1 S 73.3 W
		e		40	12.0		1.0			h about 49 km
		e			21.9		0.9			0 = 22 28 00.9
25 Oct	LP	eSur	00	27	45			NE	T	Medium surface waves, Rayleigh type, on LP.
25 Oct		eP	02	38	08.5	1	0.6		T	
25 Oct		eP	05	54	07.2	1	0.6		T	
25 Oct		eP	05	56	41.2	2	0.8		T	
		e			53.0		1.0			
25 Oct		eP	06	05	53.8	2	0.8		T	Weak surface waves,
	LP	eSur		19	00					Rayleigh type, on LP.
25 Oct		eP	07	30	45.2	3	1.0		T	
25 Oct		eP	09	03	06.1	129	0.8		T	Off west coast of Peru
		ePcP		04	32.6		0.8			9.7 S 78.6 W
		eScP		08	20.5		1.3			h about 110 km
		e			31.2		1.5			0 = 08 54 36.6
		e			49.8		1.0			Medium surface waves,
	E	eS		10	02.2		1.7			Rayleigh type, on LP.
	LPN	eScS		12	42		20.0			
	N	e			51.8		1.8			
	LP	eSur		18	50					
25 Oct		eP	09	24	24.7	1	0.7		T	
		e		25	05.0		0.8			
25 Oct		eP	09	40	44.0	2	0.8		T	
25 Oct		eP	10	28	21.5	2	1.0		T	

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
25 Oct		eP	10	56	03.8	21	1.6		T	
25 Oct		eP	14	33	21.7	92	1.9		T	Tonga Islands region
	LPN	eSKS		43	55		12.0			20.3 S 174.1 W
	LPN	eS		44	20		15.0			h about 25 km
	LPN	ePS		45	30		17.0			0 = 14 20 20.8
	LPN	eSS		50	09		20.0			Medium surface waves,
	LPN	eSur		56	50					Love and Rayleigh type,
	LP	eSur	15	02	00					on LP.
25 Oct		eP'	16	43	17.6	9	1.0		T	Gulf of Aden
		ePP		45	10.0		1.4			14.4 N 56.7 E
		e		48	24.4		1.0			h about 40 km
	LPN	e(SKKS)		52	00		23.0			0 = 16 24 16.3
	LPN	ePS		55	05		18.0			Medium surface waves,
	LPN	ePPS		56	40		15.0			Rayleigh type, on LP
	LP	eSur	17	26	00					at 17 36 45.
	LP	eSur		36	45					
25 Oct		eP	18	17	07.5	6	0.5		T	
25 Oct		eP	19	36	37.6	4	0.5	ENE	NR	$\triangle$(S-P) = 1.6°
		e			39.0		0.4			
		e			41.3		0.5			
		e			46.5		0.4			
		eS			58.5	999				
		e		37	01.6	999				
25 Oct		eP	20	58	36.5	3	1.0		T	
25 Oct		eP	21	28	13.3	3	0.9		T	
25 Oct		eP	22	51	07.1	16	1.5		T	Tonga Islands region
	LP	eSur	23	24	30					20.3 S 173.2 W
										h about 25 km
										0 = 22 38 06.6
										Weak surface waves,
										Rayleigh type, on LP.

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
26 Oct		e(P)	00	53	14.9	2	1.0		T	Bismark Sea
		eP'		56	55.8	4	1.2			3.1 S 147.4 E
		ePP		57	23.5		2.4			h about 14 km
	LP	ePP			30		20.0			0 = 00 38 20.3
		e			59.1		2.5			Mag. 6-1/4 (Pas)
	LP	e	01	00	15		14.0			6-1/4 (Berk)
	LP	e		02	43		15.0			Strong surface waves,
	LPE	eSKS		03	42		22.0			Love and Rayleigh type,
	BBE	e(SKKS)		04	34		13.0			on LP and BB.
	LPE	e(SKKS)			42		21.0			Initial arrival is
	LPN	eS		05	20		20.0			P diffracted.
	LP	eSP		07	04		18.0			
	LP	eScSP			34		19.0			
		$ePKKP_1$		08	02.3		0.6			
		$ePKKP_2$			06.9		1.3			
	LPN	eSS		13	02		30.0			
	LP	eSSP			48		28.0			
	LP	eSKKS		15	10		23.0			
	LPN	e		16	15		20.0			
	LPN	e(SSS)		17	05		24.0			
	LP	eSKKKS		18	50		22.0			
	LP	e		20	46		22.0			
	LPN	ePKPSKS		23	47		30.0			
	LPN	eSur		25	22					
	LP	eSur		30	00					
26 Oct		eP	03	12	37.7	1	0.6		T	
26 Oct		eP	03	52	26.9	1	0.6		T	
26 Oct		eP	04	42	38.4	22	1.7		T	
26 Oct		eP	04	44	50.9	4	0.7		T	
26 Oct		eP	04	48	03.4	2	1.0		T	
26 Oct		eP	05	39	51.5	3	0.7		T	
26 Oct		eP	06	07	33.0	2	0.9		T	

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
26 Oct		eP	06	21	53.5	1	0.9		T	
26 Oct		eP	08	27	46.3	6	1.2		T	Off coast of Chile
		e			54.0		1.3			37.9 S 73.4 W
	LPN	eS		37	31		19.0			h about 55 km
	LPN	eSur		53	00					0 = 08 16 03.4
										Weak surface waves,
										Rayleigh type, on LP.
26 Oct		eP	09	27	17.8	2	1.0		T	
26 Oct		eP	10	20	07.5	2	0.9		T	
26 Oct		eP	12	02	31.5	2	0.9		T	
26 Oct		eP	12	05	22.5	3	1.1		T	
26 Oct	LP	eSur	12	07	00				T	New Hebrides Islands
										17.9 S 167.7 E
										h about 124 km
										0 = 11 11 26.2
										Weak surface waves,
										Rayleigh type, on LP.
26 Oct		eP'	15	46	31.2	10	0.9		T	Off west coast of
	LP	ePP		49	44		21.0			Sumatra
	LP	eSKP		50	34		16.0			0.4 S 98.6 E
	LP	e(SKP)			54		16.0			h about 18 km
	LP	ePPP		52	55		21.0			0 = 15 27 02.0
	LP	e		54	10		16.0			Mag. 6 (Pas).
	LP	e(PcPPKP)			49		23.0			Strong surface waves,
	LPE	eSKKS		56	47		18.0			Love and Rayleigh type,
		e		58	10.3		1.2			on LP and BB.
		e(SKKP)			28.0		1.6			
	LP	e(SKKP)			38		25.0			
		e			45.0		2.0			
	LP	e(SKKP)	16	00	06		19.0			
	LP	eSKKS		02	20		25.0			

(continued on next page)

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
	LP	e(SKKS)		03	29		29.0			(continued from
	LP	eSKKKS		04	57		33.0			preceding page)
	LPN	eSS		08	10		20.0			
	LPE	eSKSSKS		09	10		23.0			
	LP	e(PKPSKS)		11	31		23.0			
	LPE	eSSS		13	30		39.0			
	LP	eSSP		22	00		29.0			
	LPE	eSSS		31	00		29.0			
	LPN	eSur		35	20					
	LP	eSur		41	55					
26 Oct		eP	16	07	21.3	1	0.8		T	
26 Oct		eP'	16	25	10.3	4	0.8		T	Off west coast of
		e			20.7		0.7			Sumatra
		e			44.4		0.8			0.1 S 98.6 E
		ePP		28	26.5		1.4			h about 87 km
										0 = 16 05 49.5
26 Oct		eP	17	26	14.5	23	0.8		T	Guerrero, Mexico
		e			26.5	999				18.0 N 100.0 W
	N	e(Sur)		29	43.0		5.0			h about 43 km
	LP	eSur		31	55					0 = 17 22 18.4
										Strong surface waves
										on all systems.
26 Oct		eP	17	30	35.9	12	0.8	SSW	T	
		e			47.0		0.8			
26 Oct		eP	18	04	40.5	1	0.3		NR	$\triangle$(S-P) = 1.6°
		e			50.2		0.4			
	E	eS		05	01.9	999				
26 Oct		eP	18	39	52.4	3	0.8		T	
26 Oct		eP'	19	48	01.5	7	0.8		T	Off west coast of
		e			16.3		0.8			Sumatra
		e			58.0		0.9			0.3 S 98.5 E
		e(PP)		50	56.3		1.5			h about 58 km
	LPE	eSur	20	38	00					0 = 19 28 37.3
										Weak surface waves
										on LP.

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
26 Oct		eP	21	13	49.0	1	0.8		T	
26 Oct		eP	22	03	06.8	8	0.7		T	Colombia
		e		05	06.0		1.0			6.9 N 73.1 W
		e			20.2		0.6			h about 167 km
		ePcP			29.0		0.6			0 = 21 56 18.2
	N	eS		08	36.0		1.0			
26 Oct		eP	22	09	00.4	2	0.7		T	$\triangle$(S-P) = 23°
		e		10	21.5		1.0			Possible new event
		e		11	42.9		0.6			at 22 12 00.8
		e		12	00.8		1.0			
	E	eS		13	06.0		1.5			
26 Oct		eP	23	29	28.8	2	0.4		NR	$\triangle$(S-P) = 1.6°
	E	eS			50.1		0.5			
	E	e			52.9		0.5			
26 Oct		eP	23	44	12.8	1	0.6		T	
27 Oct		eP	01	59	04.1	2	0.9		T	
27 Oct		eP	03	43	14.3	2	0.9		T	Phase of 03 50 00
		e			33.6		0.8			possibly of following
	LPN	e		50	00		16.0			event.
27 Oct		eP	03	46	29.1	2	0.7		T	
		e		47	23.6		0.8			
		e		48	17.6		1.0			
27 Oct		eP	04	50	35.5	1	0.8		T	
27 Oct		eP	05	03	11.1	1	0.6		T	Possible new event
		e			22.9		0.9			at 05 03 22.9
27 Oct		eP	08	41	59.5	1	0.6		T	
27 Oct		eP'	10	50	14.5	2	0.6		T	Sumatra
		e			20.0		0.9			4.7 S 104.7 E
										h about 20 km
										0 = 10 30 30.1

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
27 Oct		eP	11	33	45.8	1	0.6		T	
		e		34	01.0		0.6			
		e			14.0		0.7			
27 Oct		iP	12	21	15.3	d 7	0.8	NW	T	
27 Oct		eP	14	09	56.6	1	1.0		T	
27 Oct		eP	16	32	00.1	4	0.7	SE	T	
		e			12.8		0.9			
		e			16.5		0.6			
27 Oct		eP	16	52	01.2	1	0.5		T	
27 Oct		eP	18	04	26.4	3	0.7	SE	R	
		e			29.4		0.5			
		e			39.0		0.9			
	E	eSur		08	16.0		0.7			
27 Oct		eP	18	11	30.1	2	0.3		NR	$\triangle$(S-P) = 1.7°
		e			31.0		0.6			
		e			39.6		0.3			
	E	eS			51.5	999				
27 Oct		eP	18	58	01.9	1	0.7		T	
27 Oct		eP	19	27	26.2	3	0.6	NW	T	
27 Oct		eP	19	53	06.7	6	1.5		T	
27 Oct		eP	20	07	26.7	2	0.9		T	
27 Oct		eP	22	11	41.8	2	0.7		R	$\triangle$(Lg-P) = 12°
		e		12	01.8		1.1			Surface is Lg.
	N	eSur		15	13.5		0.6			

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
27 Oct		eP	23	11	37.8	2	0.6		NR	$\triangle$(S-P) = 3.1°
		e			41.2		0.4			
	E	e			45.0		0.5			
	E	eS		12	15.9		0.4			
	E	e			28.5		0.4			
28 Oct		eP	01	47	10.3	6	0.9		T	Fiji Islands 17.7 S 178.9 W h about 605 km 0 =01 34 59.5
28 Oct		eP	04	35	45.2	3	0.8	SE	T	
28 Oct		eP	05	38	39.4	5	1.0		T	Off coast of Peru
		e			55.0		0.6			9.3 S 80.0 W
		e		39	07.4		1.1			h about 33 km.
		ePcP		40	08.7		0.8			0 = 05 30 04.5
		e(PP)			43.4		1.2			
28 Oct		eP	06	30	33.8	2	0.8		T	
		e		31	11.0		1.2			
28 Oct	LP	eSur	06	47	05				T	Santa Cruz 11.6 S 166.4 E h about 34 km 0 = 06 00 33.7 Strong surface waves, Rayleigh type, on LP.
28 Oct		eP	07	00	18.1	6	1.0		T	Fiji Islands 18.9 S 178.1 W h about 631 km 0 = 06 48 08.8
28 Oct		eP	07	49	36.5	1	0.9		T	
28 Oct		eP	09	35	35.2	2	1.0		T	Tonga Islands
		e		36	10.6		1.3			20.3 S 174.1 W h about 76 km 0 = 09 22 39.9

DATE	Syst.	Phase	Arrival Time G. C. T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
28 Oct		eP	11	00	27.9	1	0.9		T	Iran
		e		03	49.0		0.8			33.7 N 48.5 E
		e		04	21.0		0.8			h about 34 km
		ePP			57.1		1.4			0 = 10 46 40.2
		e		05	55.0		2.0			Weak surface waves
		ePKKP		16	25.6		1.0			on LP.
	LP	eSur		35	45					Initial arrival is P diffracted.
28 Oct		eP	12	49	22.2	6	1.2		T	
28 Oct		eP	13	56	20.4	1	0.3		NR	$\triangle$(S-P) = 4.4°
	N	eS		57	11.5		1.0			
28 Oct		eP	15	01	01.6	21	1.2		T	Near coast of Chile
		e			37.2		1.2			38.7 S 73.3 W
		e		02	08.4		1.3			h about 43 km
		e		05	07.8		1.4			0 = 14 49 13.6
	LPN	eS		10	46		17.0			Weak surface waves,
	LPN	e(SS)		15	15		20.0			Rayleigh type, on LP.
	LPN	e(SSS)		19	00		18.0			
	LP	eSur		24	12					
28 Oct		eP	15	25	22.6	1	0.8		T	
		e			43.9		1.0			
28 Oct		eP	17	35	53.6	3	0.9		T	
28 Oct		eP	18	31	36.3	4	0.8		T	
		e		32	19.0		0.8			
28 Oct		eP	21	40	43.6	6	1.0		T	

DATE	Syst.	Phase	Arrival Time G. C. T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
28 Oct		eP	22	58	40.4	51	1.6		T	New Hebrides Islands
		e			47.3		1.5			region
		e		59	23.9		1.2			13.9 S 166.0 E
		e	23	00	15.4		1.5			h about 89 km
	LPN	ePP		03	00		17.0			0 = 22 44 33.6
	BBE	$eSKS_1$		09	06		7.5			Strong surface waves,
	BBE	$e(SKS_2)$			35		7.5			Rayleigh type, on LP.
	LPN	ePS		11	48		17.0			Weak surface on BB
	LPN	ePPS		13	03		15.0			at 23 31 33.
		$ePKKP_1$		14	26.6		0.6			
		$ePKKP_2$			48.3		1.0			
	LPN	eSS		17	25		26.0			
	LPN	e		24	30		24.0			
	LPE	e(Sur)		27	38					
	LP	eSur		31	33					
28 Oct		eP	23	33	00.8	1	0.4		NR	$\triangle$(S-P) = 1.7°
		e			10.2		0.4			
		eS			22.2	999				
29 Oct		eP	08	40	55.8	1	0.6		T	
29 Oct		eP	09	17	54.0	76	1.0		T	Vancouver Island region
	BB	e		18	35		6.0			49.0 N 128.7 W
	LPN	eSur		22	31					h about 16 km
										0 = 09 12 15.7
										Strong surface waves
										on all systems
29 Oct		eP	11	14	38.3	6	0.9	NW	T	
29 Oct		eP	11	22	32.2	1	0.9		T	
29 Oct		eP	14	05	41.7	3	1.1		T	Vancouver Island region
		e		07	23.3		1.7			49.4 N 127.6 W
	LPN	e		14	16		18.0			h about 56 km
	LPN	eSur			58					0 = 14 00 12.0
										Medium surface waves
										on LP

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
29 Oct		eP	14	52	50.5	7	1.0		T	Vancouver Island region
		e		53	00.8		1.0			48.7 N 128.3 W
		e		54	25.9		1.3			h about 73 km
	LPN	eS		57	15		17.0			0 = 14 47 18.3
	LPN	eSur	15	00	42					Strong surface waves on LP and BB. Weak surface on IB and SP.
29 Oct		eP	16	16	53.9	2	1.1		T	
29 Oct		eP	16	19	36.2	1	0.5		R	
		e			56.1		0.6			
		eSur		21	18.3	999				
29 Oct		eP	18	08	53.9	18	1.8		T	
		e		11	27.9		2.4			
		e		13	08.7		1.1			
	LPN	e		14	50		18.0			
29 Oct		eP	19	34	15.6	2	0.9		T	
		e			37.2		0.8			
		e		37	42.3		0.9			
	LPN	e(Sur)		41	27					
	LPN	e(Sur)		42	41					
29 Oct		eP	20	02	17.1	5	0.8		T	
29 Oct		eP	21	58	51.0	3	1.1		T	
29 Oct		eP	23	27	02.1	5	1.2		T	
29 Oct		eP	23	33	19.0	1	0.8		T	
30 Oct		eP	00	38	33.3	2	0.6		R	$\triangle$(Lg-P) = 11.4°
		e		39	10.9		0.7			Surface is Lg.
	E	eSur		41	51.1		0.8			

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
30 Oct		eP	00	46	02.5	1	0.7		T	
30 Oct		eP	01	49	57.8	161	1.8		T	Off coast of Oregon
		e		50	47.3		2.6			42.5 N 126.6 W
	LPN	eS		54	25		16.0			h about 50 km
	LP	eSur		57	02					0 = 01 44 53.2
	LP	eSur		58	11					Strong surface waves on LP and BB. Weak surface waves on SP and IB.
30 Oct		eP	02	21	39.9	2525	2.7		T	Off coast of Oregon
		e		22	32.8		2.0			42.3 N 126.7 W
		e		23	21.2		2.8			h about 36 km
	LPN	eS		26	09		13.0			0 = 02 16 32.7
	LP	eSur		28	41					Strong surface waves on LP and BB. Weak surface waves on SP and IB.
30 Oct		eP	04	59	19.5	3	0.7		T	Off south coast of
		e			37.8		0.7			Kamchatka
										50.8 N 158.3 E
										h about 32 km
										0 = 04 47 59.8
30 Oct		iP	08	44	44.0	c 19	0.8	NNW	T	$\triangle$(S-P) (SS-P) = 71.5°
		e		45	17.4		1.0			$\triangle$(P'P'-P) = 71°
	LPN	eS		54	02		26.0			Phase reported at
	LPN	eSS		58	43		29.0			15 47 00 is arrival of
	LP	e	09	02	32		27.0			acoustic wave.
	LPN	e		03	53		22.0			Strong surface waves,
	LPN	e		05	47		16.0			Rayleigh type, on LP.
	LP	eSur		07	06			NNW		Weak surface on BB
		eP'P'		12	41.5		1.2			at 09 07 06.
	LP	eSur		18	55					
	LP	e	15	47	00		205.0			

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
30 Oct		eP	13	25	20.0	1	0.5		T	Mid-Atlantic Ocean
	LPN	eSur		44	55					1.0 N 29.5 W
	LP	eSur		48	28					h about 25 km
										0 = 13 13 54.8
										Strong surface waves, Love and Rayleigh type, on LP.
30 Oct		eP	14	20	37.3	1	0.5		T	
30 Oct		eP	16	06	24.8	38	1.4	WNW	T	Weak surface waves
		e			36.7		1.0			on LP.
		e		07	13.8		1.2			
	LPN	e		14	09		14.0			
	LPN	eSur		25	28					
30 Oct		iP	16	40	52.4	c 999		NE	L	$\triangle$(S-P) less than 0.1°
		eS			54.6	999				
30 Oct		eP	17	31	33.1	1	0.6		T	
30 Oct		eP	17	48	18.1	2	0.8		T	Kermadec Islands
		epP		49	15.9		0.9			28.5 S 178.1 W
		ePKKP	18	04	51.1		0.9			h about 219 km
										0 = 17 35 03.3
30 Oct		eP	18	05	18.3	3	1.0		T	
30 Oct		eP	18	15	12.8	1	0.7		T	
30 Oct		eP	19	06	26.2	1	0.3		NR	$\triangle$(S-P) = 3.1°
	E	eS		07	02.8		0.5			
30 Oct		eP	19	09	59.2	3	0.6	SE	T	
		e		10	48.5		0.6			

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
30 Oct		eP	21	28	56.8	39	1.5		T	South of Honshu, Japan
		e		30	23.0		1.6			28.9 N 141.8 E
		e		31	47.5		1.4			h about 31 km
		ePP		32	46.3		2.0			0 = 21 15 35.2
	LPE	eSKS		39	35		15.0			Strong surface waves,
	LPN	eS		40	12		21.0			Love and Rayleigh type,
	LPE	ePS		41	28		19.0			on LP.
	LPE	eSS		46	30		23.0			Weak surface waves
	LPN	eSur		55	56					on BB.
	LP	eSur	22	00	42					
30 Oct		eP	22	53	09.2	1	0.6		T	
31 Oct		eP	00	03	49.3	1	0.4	SW	NR	$\triangle$(S-P) = 2.3°
	E	eS		04	16.6		0.4			
31 Oct		eP	00	13	30.0	1	0.3		NR	$\triangle$(S-P) = 1.7°
	E	eS			51.6		0.4			
31 Oct		eP	01	40	30.8	2	0.8		T	
31 Oct		eP	01	54	07.3	22	1.2		T	Rat Islands, Aleutians
		e			16.0		1.0			51.9 N 176.1 E
		e			40.2		0.9			h about 35 km
		e			55.4		1.6			0 = 01 43 53.3
		e		55	31.7		1.0			Strong surface waves
	LPN	eS	02	02	37		15.0			on LP.
	LPE	eSur		09	08					Medium surface on BB.
	LPN	eSur		15	25					
31 Oct		eP'	03	38	59.1	3	0.8		T	Near coast of Sumatra
		e		39	11.6		0.6			5.0 S 104.1 E
	LP	eSur	04	39	45					h about 27 km
										0 = 03 19 28.0
										Weak surface waves on LP.
31 Oct		eP	06	52	02.0	2	0.8		T	

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
31 Oct		eP	08	40	36.3	14	1.1	NNE	T	Phase reported at 15 45 00 is arrival of acoustic wave. Strong surface waves on LP.
	LP	eSur	09	04	00					
	LP	e	15	45	00		200.0			
31 Oct		eP	08	49	11.5	6	0.8		T	Weak surface waves on LP.
	LP	eSur	09	13	49					
31 Oct		eP	11	31	54.0	2	0.9		T	
31 Oct		eP	11	54	04.0	2	0.8		T	
31 Oct		eP	12	00	23.7	2	0.8		T	
31 Oct		eP	12	25	22.5	2	0.9		T	Weak surface waves on LP.
		e			31.7		0.8			
	LP	eSur		43	10					
31 Oct		eP	13	49	35.3	2	0.7		T	
31 Oct		eP	14	11	27.8	1	0.8		T	
		e			33.0		0.7			
		e			47.8		0.7			
		e		13	21.7		0.6			
		e			43.3		0.8			
31 Oct		eP	14	59	35.8	2	0.7		T	
31 Oct		eP	15	42	48.2	2	0.9		T	
31 Oct		eP	15	52	24.7	2	0.2		NR	△(S-P) = 1.7°
		eS			45.8	999				
31 Oct		eP	16	57	02.6	8	1.0	SSE	R	
		e			31.4		0.6			
		e			45.2		0.6			
		e		58	03.0		0.7			
	E	eSur	17	00	27.2		1.4			

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
31 Oct		eP	19	18	29.5	21	1.5		T	
31 Oct		eP	20	35	40.5	3	0.9		T	Weak surface waves on LP
	LPE	eSur		51	15					
31 Oct		eP	20	46	46.9	3	0.8		T	
31 Oct		eP	21	02	54.3	2	0.8		T	
		e		03	06.0		0.7			
31 Oct		eP	21	23	32.9	1	0.7		T	
		e			43.9		0.6			
31 Oct		eP	23	34	26.8	1	0.4		NR	△(S-P) = 1.7°
		eS			48.0	999				

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REGISTRATION OF EARTHQUAKES AT WICHITA MOUNTAINS SEISMOLOGICAL OBSERVATORY FORT SILL, OKLAHOMA, U.S.A.

Operated under the Technical Supervision of the
Air Force Technical Applications Center (AFTAC)

by

The Geotechnical Corporation
Garland, Texas

Advanced Research Projects Agency (ARPA)
Department of Defense
United States Government

THE REGISTRATION OF EARTHQUAKES

AT THE

WICHITA MOUNTAINS SEISMOLOGICAL OBSERVATORY

STATION

Station Abbreviation: WMSO
Station Identification on Film Seismograms: a
Geographical Location *: 34° 43' 05.3" N. Lat.
(Vault No. 6) 98° 35' 20.7" W. Long.

GEOCENTRIC LOCATION*: 34° 32' 09.8" N. Lat.
(Vault No. 6) 98° 35' 20.7" W. Long.

ALTITUDE (Meters)*: 505 Meters (1658)
(Vault No. 6)

GEOLOGY: The station is located on the Carlton (porphyritic) granophyre of the Wichita Mountains of Oklahoma.

NOISE LEVEL - November 1961: The periods of the predominant microseisms at WMSO are 0.5 second and 6 seconds. An amplitude distribution curve for the 0.5 second microseisms may be found on page 2.

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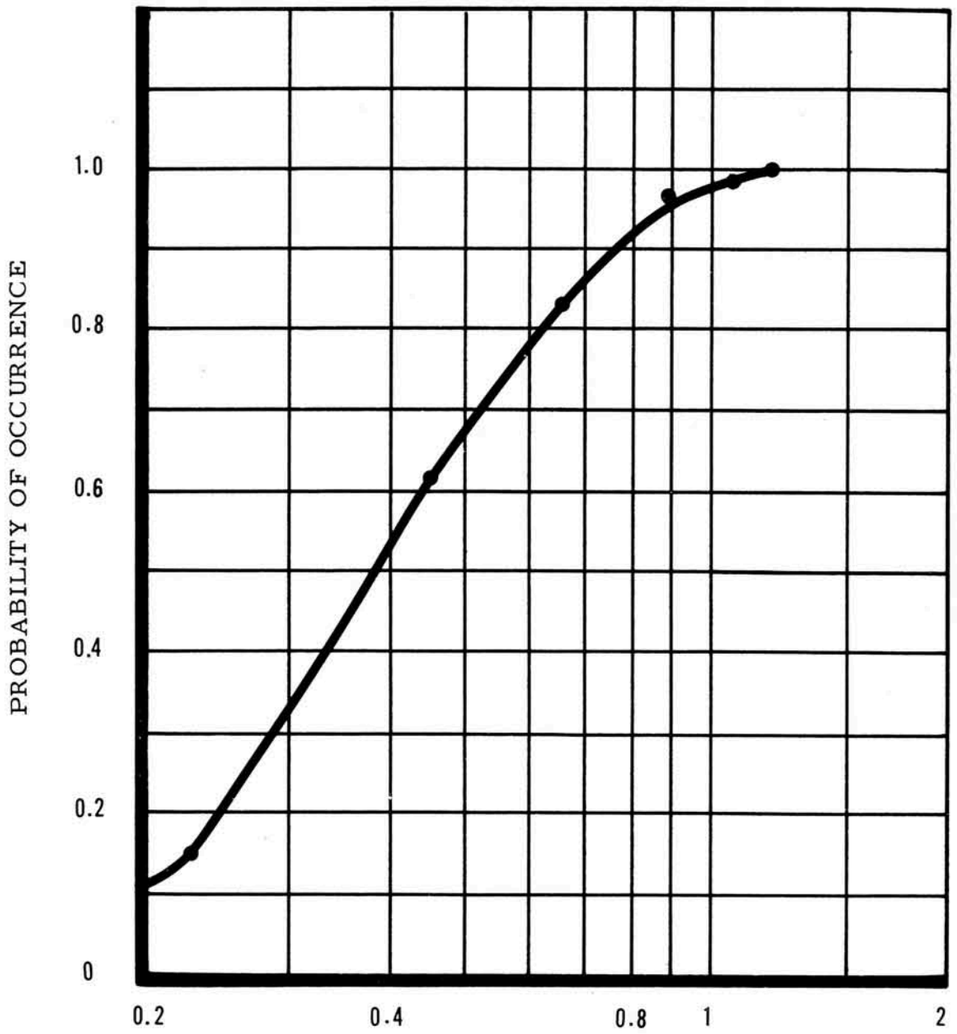
* The coordinates refer to the location of vault no. 6 which houses the 3-component groups of short-period and intermediate band seismometers from which arrival times are determined.



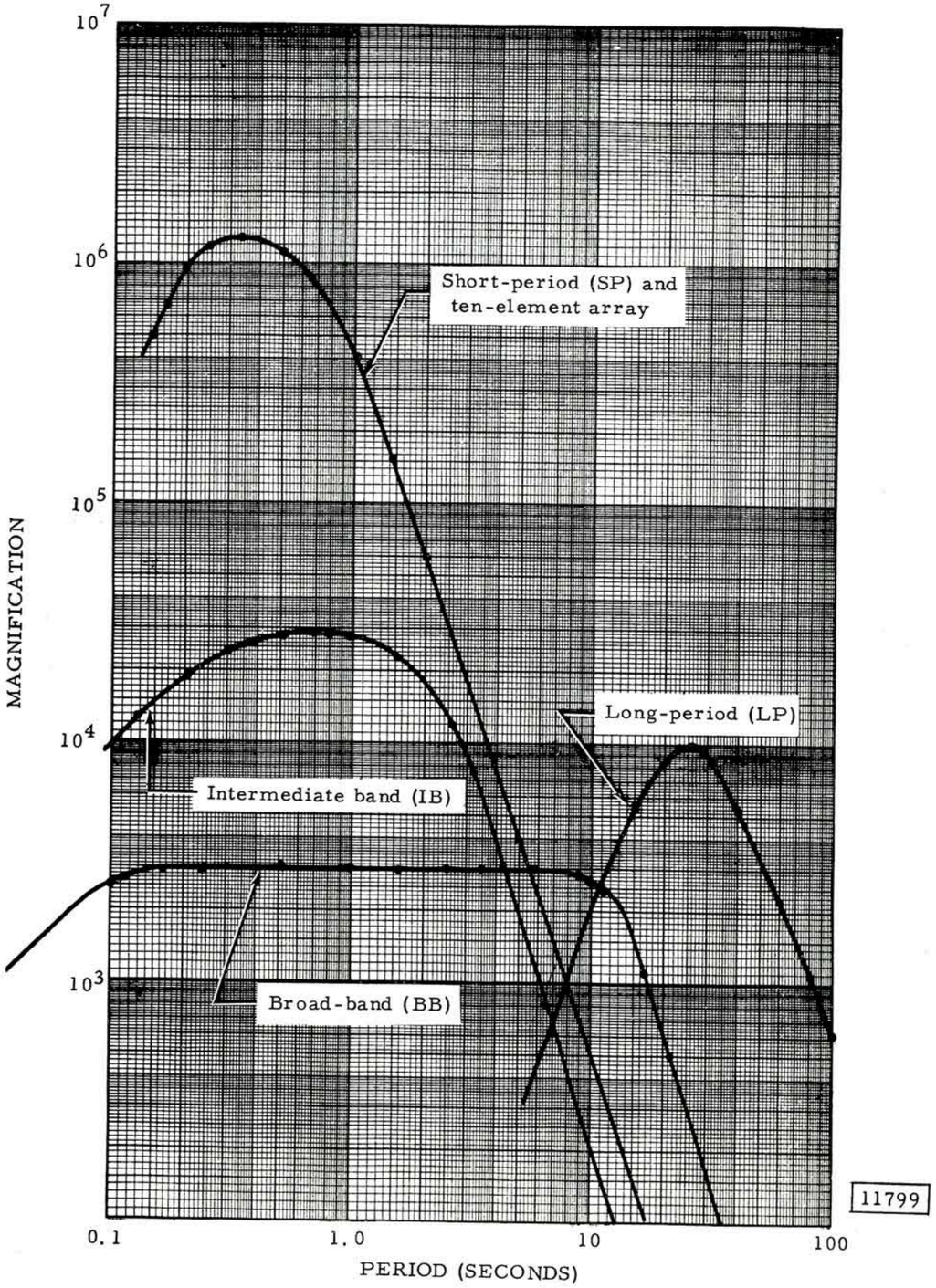
Probability of predominant 0.5-sec microseisms occurring at or less than a given amplitude at Unity magnification

SEISMOGRAPHS

	Ts	λs	Tg	λg	σ^2
SP Vertical Benioff	1.0	1.0	0.2	1.0	0.01
SP Horizontal Benioff	1.0	1.0	0.2	1.0	0.01
IB Vertical Melton	2.5	0.65	0.64	1.5	0.002
IB Horizontal Sprengnether	2.5	0.65	0.64	1.5	0.0005
BB Vertical Press-Ewing	12.5	0.4	0.64	9.0	0.0002
BB Horizontal Sprengnether	12.5	0.4	0.64	9.0	0.0004
LP Vertical Sprengnether	25.0	1.0	30	1.0	0.004
LP Horizontal Sprengnether	25.0	1.0	30	1.0	0.004

SP = Short Period
IB = Intermediate Band
BB = Broad Band
LP = Long Period
Ts = Free Period of seismometer in secs.
λs = Damping constant of seismometer
Tg = Free Period of galvanometer in secs.
λg = Damping constant of galvanometer
σ^2 = Coupling Coefficient

NOTE: Response curves may be found on page 4.



Response characteristics of seismographs

INTERPRETATION OF SYMBOLS

1. Earthquakes Listed

All local (L), near-regional (NR), regional (R), and distant earthquakes (T) are tabulated on the following pages.

2. System

In the column headed "Syst." (system), the seismograph (SP, IB, BB, or LP) and component (Z, N, or E) used to measure arrival time are designated. When no component designation appears, the phase is read from the vertical component. When neither system nor component designation appears, the phase is read from the SP vertical component.

3. Phase

(1) "i" (impetus) preceding a phase designates sudden beginning of the motion. (A designation of "i" in the case of initial P motion indicates a signal-to-noise ratio exceeding about 5/1).

(2) "e" (emersio) designates gradual beginning.

(3) "i" or "e" alone designates an unidentified phase.

(4) ( ) (parenthesis marks) indicate uncertainty.

4. Time

(1) Date and arrival time are given in Greenwich Civil Time (G. C. T.)

(2) The arrival time is reported as the earliest time on Z, N, or E. Single Z rather than the array summation ($\sum$) is used for measuring arrival times on the SP seismographs.

5. Ground Motion

(1) In the columns headed "A" and "T" are tabulated earth displacement in millimicrons and period in seconds, respectively. An amplitude of 999 indicates that a signal cannot be measured reliably. A "c" or "d" in the "A" column indicates compression or dilation, respectively, of the ground as indicated by the vertical component instrument.

The value of "A" for P phases is the maximum amplitude in the first ten seconds. All amplitudes are center-to-peak amplitudes.

(2) Trace amplitudes are measured to the nearest 1/2 millimeter at X10 view.

6. Direction

In the column headed "Dir." (direction), the direction of the epicenter as viewed from WMSO is indicated. For teleseisms, direction is obtained only from P and Rayleigh waves and is listed opposite the phase from which it is obtained. For close events, direction may be obtained from P-wave step-out shown on the individual short-period vertical traces.

7. Type

Earthquakes are identified as either:

L	(local) - - - - - - - - - - -	0°	-	1.4°
NR	(near-regional) - - - - - -	1.4°	-	6°
R	(regional) - - - - - - -	6°	-	16°
T	(teleseismic) - - - - - - -	16°	-	180°

8. Remarks Column

(1) Epicentral locations, time of origins, depth of foci, and magnitudes are obtained from the U. S. Coast and Geodetic Survey Preliminary Determination of Epicenters cards.

(2) The nature of the surface waves is indicated subjectively.

(3) Epicentral locations and distances reported by the station are accompanied by an indication of the phases used to determine epicentral distance, e.g. △ (S-P) = 6°, Central Colorado.

(4) Operational notes refer to operational difficulties that affect analysis of data.

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
01 Nov		eP	00	09	49.0	1	0.4		NR	△(S-P) = 2.2°
	E	eS		10	16.9		0.3			
01 Nov		eP	00	11	12.5	3	1.0		T	Off east coast of Hokkaido, Japan 43.6 N 146.5 E h about 15 km 0 = 23 58 50.7
		e			49.2		0.9			
01 Nov		eP	00	28	57.4	3	0.2		NR	Quarry blast near Chico, Texas △(S-P) = 1.7°
		eS		29	19.5	999				
01 Nov		eP	00	42	51.3	2	0.8		R	
		e		43	03.5		0.9			
		e			16.0		0.9			
		e			35.1		0.9			
	E	eSur		46	42.3		3.3			
01 Nov		eP	02	33	04.4	2	0.6		R	
	E	eSur		34	31.3		1.0			
01 Nov		eP	05	25	40.8	1	0.5		T	
01 Nov		eP	06	08	50.9	2	0.7		T	
01 Nov		eP	06	09	47.8	2	0.8		T	Possible phase of preceding event.
01 Nov		eP	06	49	30.7	5	0.8	SE	T	
		e			45.9		0.7			
		e		50	51.1		1.3			
01 Nov		eP	06	59	20.0	3	0.9		T	
01 Nov		eP	07	42	04.1	4	1.2		T	
01 Nov		eP	09	07	59.3	3	0.9		T	

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
01 Nov		eP	09	55	58.2	3	0.8		T	
		e			38.5		0.7			
		e		57	35.2		0.7			
01 Nov		eP	10	02	52.9	6	1.0		T	
		e		03	32.2		0.6			
		e		04	13.4		0.8			
01 Nov		eP	10	54	29.4	2	0.5		T	Fiji Islands region 18.0 S 178.5 E h about 631 km 0 = 10 42 21.1
01 Nov		eP	20	22	49.9	4	0.9		T	Fiji Islands 17.9 S 178.4 W h about 629 km 0 = 20 10 41.7
01 Nov		eP	20	26	47.8	3	0.7	NNE	R	
	E	e(Sur)		28	07.7		0.7			
02 Nov		eP	00	09	57.9	1	0.4		NR	Δ(S-P) = 2.5°
	E	eS		10	28.2		0.4			
02 Nov		eP	03	10	06.4	2	0.9		T	
02 Nov		eP	04	38	47.6	2	0.9		T	
		e			54.9		0.9			
02 Nov		eP	05	10	17.8	1	1.0		T	
02 Nov		eP	05	34	52.6	2	0.5		T	Fiji Islands 17.9 S 178.5 W h about 598 km 0 = 05 22 41.4
02 Nov		eP	07	59	15.8	4	1.0		T	

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
02 Nov		eP	08	48	33.0	1	0.6		T	
02 Nov		eP	08	52	23.3	2	0.7		T	
02 Nov		eP	09	27	06.5	3	0.6	SSE	R	
	N	eSur		30	23.3		0.8			
02 Nov		eP	09	42	33.8	1	0.6		T	
02 Nov		eP	09	42	58.3	2	0.8		T	Possible phase of previous event
02 Nov		eP	16	16	41.2	2	0.4		NR	Quarry blast near Fitzhugh, Okla. Δ(S-P) = 1.5°
	N	eS		17	00.3	999				
02 Nov		eP	16	30	59.2	3	0.9		T	
02 Nov		eP	23	10	59.5	9	0.8		T	Leeward Islands 17.2 N 62.7 W h about 29 km 0 = 23 03 55.6
02 Nov		eP	23	52	43.5	12	0.8		T	
03 Nov		eP	01	02	13.9	4	1.0		T	
03 Nov		eP	07	19	11.9	6	1.2		T	
03 Nov		eP	07	23	23.1	1	1.0		T	Possible phases of previous event
		e			55.0		1.0			
03 Nov		eP	08	01	23.6	1	0.6		T	
03 Nov		eP	08	09	22.7	4	1.1		T	
03 Nov		eP	08	57	21.2	2	1.0		T	
03 Nov		eP	09	42	16.4	2	0.8		T	

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
03 Nov		eP	09	50	07.6	1	0.6		T	
03 Nov		eP	16	21	07.0	2	0.9		T	
03 Nov		eP	17	09	24.3	3	0.9		T	
03 Nov		eP	18	04	42.7	1	0.3		NR	△(S-P) = 1.7°
		eS		05	04.1	999				
03 Nov		eP	20	40	09.5	1	0.6		T	Possible new event
		e		43	28.4		0.9			at 20 43 28.4
03 Nov		eP	20	47	29.6	2	1.0		T	Possible new event
		e		50	08.3		0.8			at 20 50 08.3
03 Nov		eP	21	18	49.7	3	1.2		T	Tonga Islands 20.0 S 173.8 W h about 25 km 0 = 21 05 49.7
03 Nov		eP	21	27	25.4	5	1.1		T	
03 Nov		eP	22	03	06.3	1	0.7		T	
		e			23.0		0.8			
		e			52.7		0.5			
		e		04	40.7		0.8			
		e		07	19.1		0.8			
03 Nov		eP	22	28	18.1	2	1.0		T	
03 Nov		eP	22	48	50.4	1	0.7		T	
03 Nov		eP	22	50	53.9	7	0.9		T	
03 Nov	LP	eSur	23	06	24				T	Loyalty Islands region 22.5 S 170.2 E h about 91 km 0 = 22 15 46.1 Weak surface waves on LP.

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
03 Nov		eP	23	08	16.5	2	1.1		T	
03 Nov		eP	23	09	06.5	4	1.0		T	
04 Nov		eP	01	54	36.3	5	0.9		T	
04 Nov		eP	02	27	00.8	6	0.7		T	Possible new event
		e			09.5		0.9			at 02 29 33.7
		e		29	33.7		0.7			
04 Nov		eP'	03	23	08.3	9	1.1		T	Near north coast of
		e			24.8		1.0			New Guinea
		e			44.6		1.1			2.9 S 137.2 E
		e		25	24.3		0.9			h about 51 km
		e			55.1		1.2			0 = 03 04 21.2
		e(SKP)		26	18.2		1.1			Weak surface waves
		ePKKP		33	21.7		1.0			on LP
	LP	eSur		59	30					
04 Nov		eP	03	25	00.4	4	0.8		T	
04 Nov		iP	03	50	01.8	c 22	1.0		T	Kurile Islands
		e			15.7		0.9			50.0 N 155.5 E
		e(PcP)			20.7		0.8			h about 32 km
		e			35.6		0.8			0 = 03 38 30.1
		e		51	25.2		1.0			
		e		52	00.3		0.9			
04 Nov		eP	06	56	44.1	7	1.3		T	
04 Nov		eP	07	31	37.5	7	0.8		T	Weak surface waves
	LPE	eSur		58	33					on LP
04 Nov		e(P')	13	24	34.9	2	0.9		T	Eastern Tibet
	LPN	eSur		58	16					32.1 N 92.2 E h about 25 km 0 = 13 05 03.3 Weak surface on LP. Initial arrival is late for P'.

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
04 Nov		eP	14	44	09.6	4	0.7		T	Andreanof Islands,
		e(PcP)		45	08.9		0.8			Aleutian Islands
										52.4 N 175.4 W
										h about 75 km
										0 = 14 34 36.5
04 Nov		eP	17	40	40.5	3	1.0		T	
04 Nov		eP	18	14	51.4	1	0.4	ESE	NR	Quarry blast near
		eS		15	13.1	999				Fitzhugh, Oklahoma
										$\triangle$(S-P) = 1.7°
04 Nov		eP	18	26	01.6	6	0.9		T	
		e			57.4		1.2			
		e		27	46.7		1.3			
		e		28	53.2		1.0			
04 Nov	LP	eSur	18	41	05				T	Medium surface waves
										on LP.
04 Nov		eP	21	34	20.2	1	0.3		NR	Quarry blast near
		eS			41.1	999				Chico, Texas
										$\triangle$(S-P) = 1.6°
05 Nov		eP	00	12	45.5	1	0.6		NR	$\triangle$(S-P) = 2.8°
	E	eS		13	19.1		0.5			
05 Nov		eP	00	14	18.7	4	1.0		T	
05 Nov		eP	00	20	23.3	11	1.4		T	
05 Nov		ePKKP	00	50	01.8		0.8		T	Santa Cruz Islands
	LP	eSur	01	07	50					region
										11.6 S 166.4 E
										h about 67 km
										0 = 00 20 02.7
										Weak surface waves
										on LP

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
05 Nov		eP	01	09	31.1	2	0.4		NR	$\triangle$(S-P) = 2.2°
	E	eS			58.6		0.4			
05 Nov		eP	04	39	56.6	4	1.0		T	
05 Nov		eP	04	50	58.3	12	1.1	SE	T	
		e		51	18.7		1.0			
05 Nov		eP	09	11	05.8	4	1.0		T	
		e		13	41.5		0.8			
05 Nov		e	10	00	51.3		1.1		R	Southwestern Montana
		eSur		01	17.2		1.1			45.2 N 111.5 W
										h about 25 km
										0 = 09 53 11.3
										P phase not detected
05 Nov		eP	10	37	17.9	4	0.8		T	
		e			37.4		0.8			
05 Nov		eP	10	48	37.3	11	0.7		T	Kurile Islands
		epP		49	12.7		0.9			45.7 N 147.9 E
										h about 142 km
										0 = 10 36 39.5
05 Nov		eP	13	18	15.2	2	1.0		T	
05 Nov		eP	16	30	57.0	3	1.0		T	
05 Nov		eP	19	37	27.0	9	1.2		T	
		e			48.0		1.3			
05 Nov		eP	23	13	47.6	1	0.4	NE	NR	$\triangle$(S-P) = 2.6°
	E	eS		14	19.5		0.6			
05 Nov		eP	23	33	06.4	5	0.7	SE	T	
		e			15.4		0.8			
		e			51.8		1.0			

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
06 Nov		eP'	00	15	05.8	1	1.1		T	Northwest of Auckland Islands, New Zealand
		e			13.1		1.2			49.4 S 163.3 E
	LP	eSur		54	56					h about 35 km
										0 = 23 56 25.4
										Weak surface waves
										Rayleigh type, on LP.
06 Nov		eP	04	17	51.0	1	1.0		T	
06 Nov		eP	05	21	16.7	4	1.1		T	
06 Nov		eP	05	22	23.0	1	0.7		T	Near coast of Peru
		e			39.1		0.7			13.3 S 76.7 W
		e			45.2		1.1			h about 133 km
		e		23	51.9		1.0			0 = 05 13 22.5
										Possible new event
										at 05 23 51.9
06 Nov		e(P)	05	44	20.0	3	1.0		T	Santa Cruz Islands
	LP	ePP		46	25		30.0			region
		e		47	30.4		0.8			13.3 S 166.0 E
		e		48	07.6		1.0			h about 210 km
	LP	e(PPP)		49	00		30.0			0 = 05 28 39.3
	LPN	eSKS		52	48		16.0			Initial arrival is
	LPN	ePS		55	28		18.0			P diffracted
	LPN	ePPS		56	28		20.0			Strong surface waves,
		ePKKP		58	42.0		0.9			Rayleigh type, on LP
		e	06	00	06.8		0.9			at 05 16 00.
	LPN	ePSS		01	10		24.0			Medium surface on BB.
	LP	e(SKKP)		02	00		30.0			
		ePcPP'			36.8		1.1			
	LPN	e(SSS)		05	00		24.0			
	LPN	e(SKKKS)		08	05		26.0			
	LP	e		10	44		28.0			
	LPE	e(Sur)		11	08					
	LP	eSur		16	00					

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
06 Nov		eP	07	23	05.0	3	0.7		T	Near coast of southern
		e			31.9		0.7			Chile
										34.6 S 72.2 W
										h about 16 km
										0 = 07 11 33.2
06 Nov		eP	08	27	23.0	2	1.0		T	
		e		28	17.3		1.0			
06 Nov		eP	13	52	25.8	3	1.0		T	
06 Nov		eP	18	02	56.0	1	0.3		NR	Quarry blast near
		eS		03	17.2	999				Chico, Texas
										$\triangle$(S-P) = 1.7°
06 Nov		eP	18	32	51.4	2	0.5		T	Catamarca Province,
										Argentina.
										27.6 S 66.2 W
										h about 184 km
										0 = 18 21 59.9
06 Nov		eP	22	18	42.8	2	0.3	E	L	$\triangle$(S-P) = less than 0.1°
	E	e(S)			44.5		0.4			
		e			45.4		0.4			
06 Nov		eP	22	19	22.8	2	0.2		L	$\triangle$(S-P) = less than 0.1°
	E	eS			24.9		0.3			
06 Nov		eP	22	43	52.3	2	0.4		L	$\triangle$(S-P) = 0.8°
	E	eS		44	04.0		0.4			
07 Nov		eP	00	17	35.2	4	1.2		T	
		e		20	24.9		1.1			
07 Nov		eP'	01	31	35.5	3	1.0		T	Samar, Philippine Islands
		ePKKP		42	11.9		0.9			11.6 N 126.1 E
	LP	eSur	02	08	45					h about 47 km
										0 = 01 12 55.7
										Weak surface waves,
										Rayleigh type, on LP.

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
07 Nov		eP	01	33	50.7	7	1.1		T	Western Oregon -
		e(Sur)		37	38.6		1.2			Washington border
	LPN	eSur		39	56					45.7 N 122.1 W
	LPN	eSur		41	06					h about 60 km
	LPE	eSur			44					0 = 01 29 10.6
										Medium surface waves
										on LP
07 Nov		eP	01	44	11.2	2	0.8		T	
07 Nov		eP	02	45	25.1	2	0.8		T	
		e			52.1		0.7			
		e		46	08.8		0.4			
07 Nov		eP	02	49	36.2	3	0.9		T	
		e		50	06.8		0.7			
07 Nov		eP	06	04	06.1	3	0.8		T	Kurile Islands
										48.2 N 153.0 E
										h about 25 km
										0 = 05 52 20.8
07 Nov		eP	09	15	37.0	5	0.7		T	
		e			51.9		0.8			
		e		16	09.7		0.8			
		e			32.1		0.7			
	E	eSur		19	24.1		0.9			
07 Nov		eP	10	42	47.8	2	0.8		T	Medium surface waves
	LPN	e		57	25		16.0			on LP
	LPN	eSur	11	02	03					
07 Nov		eP	10	52	00.4	11	1.2		T	
		e			06.8		0.9			
07 Nov		eP	11	10	27.8	1	0.8		T	
07 Nov		eP	11	50	44.4	3	1.4		T	

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
07 Nov		eP	12	28	28.3	10	1.3		T	South of Tonga Islands
		e		29	28.0		1.4			26.9 S 176.3 W
	LPN	eS		39	08		14.0			h about 54 km
	LPN	e			51		15.0			0 = 12 15 03.6
	LPN	eSur		58	56					Medium surface waves
	LPN	eSur	13	09	05					on LP
07 Nov		eP	12	52	41.6	2	1.0		T	
07 Nov		eP	13	29	00.5	2	0.8		T	
		e			10.0		0.9			
07 Nov		eP	17	47	10.1	9	1.6		T	
		e			26.0		1.0			
07 Nov		eP	19	19	23.0	1	0.8		T	Possible regional
		e(Sur)		21	26.6		0.9			
07 Nov		eP	19	35	35.2	1	0.5		T	Possible new event
		e			48.3		0.6			at 19 35 48.3
07 Nov		eP	19	40	04.5	5	0.7	SE	T	
07 Nov		eP	20	45	19.2	4	1.0		T	
07 Nov	LP	eSur	22	03	36				T	South of Kermadec
										Islands
										34.3 S 179.2 W
										h about 39 km
										0 = 21 09 47.4
										Medium surface waves
										on LP
07 Nov		eP	23	28	48.5	1	0.2	SE	NR	Quarry blast near
		eS		29	09.9	999				Chico, Texas
										$\triangle$(S-P) = 1.6°

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
07 Nov		eP	23	30	47.5	2	0.6		NR	Quarry blast near
	E	eS		31	08.8	999				Chico, Texas
										△(S-P) = 1.7°
08 Nov		eP	01	13	21.0	1	0.5		NR	△(S-P) = 3.2°
		e			24.5		0.4			
		e			27.7		0.4			
	E	eS			59.0		0.5			
08 Nov		eP	01	35	29.0	2	1.0		T	
08 Nov		eP	02	22	14.2	2	0.9		T	
		e			27.4		0.8			
08 Nov		eP	03	06	23.9	2	1.0		T	
08 Nov		eP	03	50	58.5	7	1.2		T	
08 Nov		eP	04	59	05.4	12	1.1		T	Near coast of Oaxaca,
		e			13.4		0.9			Mexico
		e			25.3		0.9			15.6 N 95.8 W
	N	eSur	05	02	39.2		1.0			h about 45 km
	LPE	eSur		04	55.8					0 = 04 54 43.8
										Medium surface waves
										on LP
08 Nov		eP	06	18	35.4	2	1.0		T	
08 Nov		eP	09	20	08.4	5	1.3		T	
08 Nov		eP	10	48	03.7	1	0.9		T	
08 Nov		eP	11	24	58.9	1	0.7		T	
08 Nov		eP	13	23	20.7	4	0.7		T	
		e			30.2		0.8			
08 Nov		eP	14	12	40.1	1	0.3		NR	△(S-P) = 4.5°
		e			49.1		0.5			
	E	eS		13	36.9		0.7			

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
08 Nov		eP	15	34	51.7	1	0.7		T	
08 Nov		eP	16	29	08.9	1	0.3		NR	△(S-P) = 1.9°
	N	e			29.8		0.4			
	N	eS			33.1		0.4			
08 Nov		eP	16	54	18.7	15	1.7		T	
		e			29.2		1.1			
08 Nov		eP	20	50	44.0	1	0.9		T	
		e		51	12.1		1.3			
08 Nov		eP	22	27	27.9	2	0.3	N	NR	△(S-P) = 1.5°
	E	eS			46.6		0.4			
08 Nov		eP	22	39	02.0	1	0.4		NR	△(S-P) = 2.6°
	E	eS			34.1		0.6			
08 Nov		eP	22	48	16.6	1	0.8		T	Chile
										29.3 S 70.7 W
										h about 61 km
										0 = 22 37 17.9
08 Nov		eP	22	56	10.6	2	0.6	SE	T	
		e			35.6		1.0			
08 Nov		eP	23	31	02.4	1	0.3	SSE	NR	Quarry blast near
		eS			23.8	999				Chico, Texas
										△(S-P) = 1.7°
09 Nov		eP	00	09	21.8	1	0.4	ENE	NR	Probable blast in
	N	eS			54.4		0.5			Keystone Dam area, Okla.
										△(S-P) = 2.7°
09 Nov		eP	01	24	05.4	2	0.8		T	Possibly diffracted P
		e			37.8		1.2			from following Loyalty
										Islands earthquake

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
09 Nov		ePKKP$_1$	01	39	16.2		0.9		T	Loyalty Islands
		ePKKP$_2$			26.1		0.9			22.0 S 170.1 E
	LPE	e		54	41		20.0			h about 33 km
	LP	eSur		59	02					0 = 01 09 16.0
										Medium surface waves, Rayleigh type, on LP.
09 Nov		eP	02	15	21.9	2	1.0		T	
09 Nov	LP	e(Sur)	03	21	06				T	
09 Nov		eP	04	20	34.4	2	1.0		T	
09 Nov		eP	04	24	48.9	1	0.6		T	
		e		25	18.1		1.4			
09 Nov		iP	04	30	08.7	d 31	1.0		T	Northern Chile -
		e			43.3		1.0			Argentina border
		ePcP			53.1		1.0			22.9 S 67.9 W
		e		31	25.5		0.8			h about 84 km
		ePP		32	28.9		1.0			0 = 04 19 42.0
		e		33	06.6		0.9			Weak surface waves,
		e			39.7		1.4			Rayleigh type, on LP
	LPN	eS		38	30		17.0			at 04 49 36.
	E	e		39	18.1		1.0			
	LPN	ePPS			26		15.0			
	LPN	eScS			56		20.0			
	LPN	e		40	50		14.0			
	LPN	eSS		42	40		18.0			
	LPN	eSSS		46	06		24.0			
	LPN	e(Sur)		47	50					
		e		49	00.9		1.2			
	LP	eSur			36					
		eP'P'		59	00.6		0.6			
		eP'P'			27.5		1.1			
09 Nov		eP	05	07	04.1	3	0.9		T	

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
09 Nov		eP	05	37	55.2	2	0.8	SE	T	
		e		38	11.9		0.8			
		e			44.7		0.8			
		e		41	38.9		1.0			
09 Nov		eP	09	57	08.8	4	1.1		T	
09 Nov		eP	10	43	19.8	2	1.0		T	
09 Nov		eP	12	14	57.1	1	0.6		T	Start indefinite
		e		15	34.8		0.9			Possible new event
		e		26	00.6		1.4			at 12 26 00.6
09 Nov		eP	12	40	03.2	2	0.7		T	
09 Nov		eP	14	36	58.7	1	0.7		T	
09 Nov		eP	15	38	31.0	1	0.8		T	Start indefinite
09 Nov		eP	15	55	27.9	1	0.3		R	
		e			45.2		0.4			
	E	eSur		56	51.2		0.5			
09 Nov		eP	16	11	23.5	4	1.0		T	Medium surface waves
		e			38.5		1.7			on LP
		e		12	13.5		1.4			
	LP	eSur		26	55					
09 Nov		eP	18	37	28.0	2	0.7		T	
09 Nov		eP	18	59	08.0	4	0.8		T	
09 Nov		eP	20	53	07.6	1	0.4		NR	$\triangle$(S-P) = 3.5°
	E	eS			44.8		0.5			
		eSur			55.4		0.8			
09 Nov		eP	21	53	31.8	4	1.0		T	

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
09 Nov		eP	23	19	13.6	15	1.1		T	Tonga Islands region
		e			24.8		0.7			15.8 S 174.9 W
		epP		20	23.2		1.1			h about 289 km
		ePKKP		36	55.9		1.0			0 = 23 06 55.5
09 Nov		eP	23	44	00.2	1	0.4	ENE	NR	Probable blast in
	E	eS			33.2		0.5			Keystone Dam area, Okla.
										$\triangle$(S-P) = 2.8°
09 Nov		eP	23	48	02.8	1	0.6		R	
	E	eSur		49	29.6		0.5			Start indefinite.
10 Nov		eP	01	52	50.7	1	0.2	NE	NR	$\triangle$(S-P) = 1.7°
	E	eS		53	12.2		0.4			
10 Nov		eP	02	16	59.1	16	1.2		T	Southern Peru
		e		17	14.0		0.8			14.3 S 71.9 W
		e			25.0		1.0			h about 68 km
		ePcP		18	02.1		0.7			0 = 02 07 34.7
		e			27.2		0.8			Strong surface waves,
		ePP		19	12.3		1.4			Love and Rayleigh type,
	LPN	eS		24	36		30.0			on LP.
	LPN	eScS		26	30		22.0			
	LPN	e		27	00		20.0			
	LPN	eSS		28	15		25.0			
	LPN	eSur		31	25					
	LP	eSur		35	00					
10 Nov		eP	04	04	08.4	1	0.4	SE	R	
		eSur		07	11.0		0.6			
10 Nov		eP	07	01	14.6	2	0.9		T	
10 Nov		eP'	07	48	46.1	2	1.0		T	Near north coast of
		ePP		49	59.1		1.1			New Guinea
	LP	eSur	08	27	47					2.5 S 138.3 E
										h about 52 km
										0 = 07 30 00.6
										Medium surface waves,
										Rayleigh type, on LP.

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
10 Nov		eP	09	00	40.0	2	0.7		T	
10 Nov		eP	09	59	52.6	2	0.6	SE	T	
		e			59.6		0.6			
10 Nov		eP	10	16	48.3	1	0.6		T	
10 Nov		eP	10	25	49.7	1	0.5		T	
10 Nov		eP	13	25	13.2	12	0.8	SSE	T	
		e			27.8		0.9			
		e		26	23.5		1.0			
		e		29	59.8		0.9			
10 Nov		eP	13	43	07.0	1	0.8		T	Possible phase of preceding event
10 Nov		eP	14	11	39.8	7	1.2		T	
10 Nov		eP	16	37	26.2	2	0.4		R	
		e			41.6		0.4			
	E	eSur		38	47.7		0.5			
10 Nov		eP	17	26	35.7	3	0.9		T	
10 Nov		eP	18	13	01.5	33	1.0		T	Fiji Islands
		epP		15	06.6		1.0			17.5 S 178.8 W
		ePP		16	48.9		1.2			h about 586 km
		ePKKP		30	15.8		0.6			0 = 18 00 49.6
10 Nov		eP	18	34	23.5	2	0.3		R	
	E	eSur		35	46.4		0.4			
10 Nov		eP	19	35	09.7	2	0.3		NR	Quarry blast near
		eS			31.2	999				Chico, Texas
										$\triangle$(S-P) = 1.6°
10 Nov		eP	23	21	15.7	3	0.4	SSE	NR	$\triangle$(S-P) = 2.2°
	E	eS			42.9		0.4			

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
10 Nov		eP	23	48	30.4	1	0.3		NR	Probable blast in
	N	eS		49	02.9		0.5			Keystone Dam area, Okla.
										△(S-P) = 2.7°
11 Nov		eP	02	06	20.7	1	0.8		T	
11 Nov		eP	04	17	40.7	1	0.6		R	Start indefinite
		e		19	49.6		0.8			
	E	e(Sur)		21	26.2		2.0			
11 Nov		eP	04	25	42.4	1	0.6		T	
		e			48.6		0.9			
		e		26	00.5		0.8			
11 Nov		eP	04	56	28.9	2	0.9		T	
11 Nov		eP	07	02	37.6	8	1.4		T	
11 Nov		eP	12	31	53.9	11	0.8		T	Off coast of Guatemala
		e		32	30.2		0.8			13.2 N 91.0 W
✓		e			55.5		1.6			h about 94 km
	LPN	eSur		35	53					0 = 12 27 03.8
	LPN	eSur		37	40					Strong surface waves on LP, IB, and SP.
11 Nov		eP	13	52	34.3	2	0.8		T	
11 Nov		eP	17	51	43.7	1	0.8		T	Fox Islands, Aleutians
										52.7 N 169.3 W
										h about 51 km
										0 = 17 42 36.4
11 Nov		eP	18	01	57.4	2	0.3		NR	Quarry blast near
		eS		02	19.3	999				Chico, Texas
										△(S-P) = 1.7°
11 Nov		eP	18	20	47.5	1	0.5		NR	△(S-P) = 3.1°
	E	eS		21	23.4		0.5			
	E	e			37.7		0.6			

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
11 Nov		eP	21	30	02.8	2	0.3	NNE	NR	△(S-P) = 1.5°
	E	eS			22.0		0.4			
11 Nov		eP	21	55	30.6	2	0.6		T	Peru
		e			56.9		0.7			8.2 S 75.0 W
		epP		56	03.2		1.0			h about 119 km
		e			25.0		0.8			0 = 21 46 59.7
		ePcP			55.3		0.6			
		ePP		57	31.1		1.0			
11 Nov		eP	22	31	57.1	1	0.6		NR	Quarry blast near
	E	eS		32	17.6		0.4			Chico, Texas
										△(S-P) = 1.6°
11 Nov		eP	22	49	54.8	1	0.4	SE	NR	Quarry blast near
	E	eS		50	15.6		0.4			Chico, Texas
										△(S-P) = 1.6°
11 Nov		eP	23	48	08.1	1	0.4		NR	Blast near Keystone
	E	eS			38.5		0.5			Dam area, Oklahoma
										△(S-P) = 2.5°
12 Nov		eP'	02	34	07.6	22	1.4		T	Congo region
		e			14.5		1.2			0.8 N 29.5 E
		e			43.4		0.9			h about 39 km
✓		ePP		35	28.7		2.5			0 = 02 15 16.7
		e			41.9		0.8			Strong surface waves,
		ePKKP		44	22.0		0.8			Love and Rayleigh type,
	LPN	ePPS		47	04		15.0			on LP
	LPE	eSS		51	49		17.0			
	LPN	eSSS		56	41		24.0			
	LPE	eSur	03	08	24					
	LP	eSur		19	44					
12 Nov		eP	03	01	58.0	2	1.0		T	
12 Nov		eP	03	31	48.5	18	0.7	SSE	T	
12 Nov		eP	05	42	49.4	1	0.8		T	

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
12 Nov		eP	08	09	59.4	2	0.7		T	
12 Nov		eP'$_2$	08	41	40.1	2	1.0		T	Mascarene Islands region
	LPN	eSur	09	42	24					16.9 S 66.9 E
	LPN	eSur		54	26					h about 34 km
										0 = 08 21 06.8
										Weak surface waves on LP
12 Nov		eP	10	29	34.5	1	0.7		T	
		e			43.5		0.8			
12 Nov		eP	14	24	27.8	3	0.9		T	Fiji Islands region
										15.6 S 175.9 W
										h about 219 km
										0 = 14 11 58.8
12 Nov		eP	15	06	40.4	7	1.2		T	
		e		07	01.4		1.2			
12 Nov		eP	15	11	57.2	2	0.5	SE	T	
12 Nov		eP	15	16	16.0	1	0.3		R	
		e			34.6		0.4			
	E	eSur		17	31.8		0.4			
12 Nov		eP	17	52	46.3	13	0.6	SSE	T	
		e			53.4		0.8			
12 Nov		eP	18	24	55.9	1	0.7		T	South of Fiji Islands region
										23.2 S 180.0
										h about 556 km
										0 = 18 12 22.0
12 Nov		eP	18	27	58.6	2	0.7		T	
		e		28	51.3		0.6			
12 Nov		eP	21	49	33.7	2	0.9		T	
		e		50	01.8		0.8			

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
13 Nov		eP	04	49	57.3	2	0.8		T	
13 Nov		eP	06	35	28.3	2	0.6		T	
13 Nov		ePP	08	00	24.8		1.4		T	Near coast of New Guinea
	LP	eSur		40	00					3.8 S 136.3 E
										h about 34 km
										0 = 07 39 53.0
										Weak surface waves on LP.
13 Nov		eP	08	19	27.1	2	0.8		T	
13 Nov		eP	10	47	30.8	11	1.1		T	
		e			46.5		0.8			
		e		48	20.9		0.5			
13 Nov		eP	11	38	49.2	8	1.3		T	
13 Nov		eP	12	51	33.8	3	1.0		R	Start indefinite
		eSur		54	12.9		1.0			
13 Nov		eP	19	50	03.0	6	1.2		T	Kurile Islands
		e			13.8		1.2			46.8 N 153.9 E
		e			36.6		1.2			h about 39 km
										0 = 19 38 15.5
13 Nov		eP	20	41	36.0	2	1.0		T	
13 Nov		eP	22	39	51.3	2	1.0		T	
13 Nov		eP	23	44	57.8	3	0.4		NR	Quarry blast near
		eS		45	19.1	999				Chico, Texas
										Δ(S-P) = 1.6°
14 Nov		eP	02	09	03.4	2	0.7		T	
		e			34.0		1.2			
		e		14	26.0		1.5			

DATE	Syst.	Phase	Arrival Time G.C.T.			Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h.	m.	s.					
14 Nov		eP	02	35	11.8	3	1.0		T	
		e		39	32.8		1.2			
14 Nov		iP	04	48	44.6	c 49	1.0		T	Off coast of Panama
		e		49	58.7		2.0			7.3 N 82.4 W
		e(PcP)		51	51.3		0.9			h about 29 km
	LPE	eSur		53	54					0 = 04 42 26.5
	LP	eSur		57	50					Mag. 6-1/4 (Pas) 6 (Berk.) Strong surface waves, Love and Rayleigh type, on LP. Strong surface, Rayleigh type, on BB.
14 Nov		eP	10	15	20.3	7	0.9		T	Honshu, Japan 36.1 N 139.0 E h about 167 km 0 = 10 02 32.7
14 Nov		eP	10	30	01.1	1	1.0		T	
14 Nov		eP	10	40	23.9	1	0.7		T	Kurile Islands
		e		41	26.7		0.8			47.0 N 153.7 E h about 26 km 0 = 10 28 33.4
14 Nov		eP	13	21	13.1	3	0.9		T	Northern Chile
		epP			43.8		0.9			19.5 S 69.6 W
		ePcP			56.7		0.6			h about 121 km
	LPE	e(SS)		32	52		18.0			0 = 13 11 14.1
	LPE	eSur		34	00					Weak surface waves on LP
14 Nov		iP'	17	33	36.4	c 38	0.7		T	Near coast of Sumatra
		e		34	04.0		0.7			5.7 S 104.3 E
		e		38	12.0		1.0			h about 16 km 0 = 17 14 00.1

DATE	Syst.	Phase	Arrival Time G.C.T.			Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h.	m.	s.					
14 Nov		eP	22	08	52.3	1	0.5	ENE	NR	△(S-P) = 3.2°
		e			59.4		0.6			
	E	eS		09	30.4		0.5			
14 Nov		eP	23	54	34.5	2	0.4		NR	△(S-P) = 1.4°
	E	eS			53.1		0.4			
15 Nov		eP	00	37	56.2	1	0.6		NR	△(S-P) = 2.6°
	E	eS		38	27.6		0.5			
15 Nov		eP	03	28	28.8	3	1.0		T	
15 Nov		eP'	04	42	21.9	14	1.0		T	Sumatra
		e			37.0		1.4			4.1 S 105.0 E
		ePP		45	30.9		2.0			h about 126 km
		e(SKP)			59.2		1.2			0 = 04 22 51.9
15 Nov		eP	05	35	15.5	2	1.0		T	
		e		37	51.5		1.0			
15 Nov		eP	05	42	53.0	106	2.4		T	Kern County, California
		e		44	24.9		1.1			34.9 S 119.1 W
	LPN	eSur		47	34					h about 26 km
	BBN	eSur		48	20		8.0			0 = 05 38 54.3
	BB	eSur		49	28		9.0			Mag. 4.9 (Pas.), 5-1/4 (Berk.) Strong surface waves on all systems
15 Nov		iP	07	29	35.9	c 149	1.1		T	Near coast of Hokkaido,
		e			46.5		2.2			Japan
	LP	ePP		32	45		14.0			43.1 N 145.1 E
		e		34	15.7		2.0			h about 43 km
	LP	e(PPP)			50		18.0			0 = 07 17 12.4
	LPE	eSKS		39	52		26.0			Strong surface waves,
	E	eScS		40	13.5		2.5			Love and Rayleigh type,
	E	e			26.9		2.9			on LP. Strong surface,
	E	e		41	05.2		3.0			Rayleigh type, on BB.
		e			30.1		3.0			Weak on SP and IB.
	LPN	eSS		45	22		30.0			
		ePKKP		47	55.9		1.6			

(continued on following page)

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
	LPN	eSSS		48	00.		26.0			(continued from preceding page)
		e			12.4		1.6			
		e			39.7		I.8			
		e			51.4		1.8			
		e		50	12.3		1.1			
	LPN	eSur		51	40					
		eP'P'		55	57.1		1.6			
	LP	eSur		57	16					
		e		59	46.5		2.0			
15 Nov		eP	09	30	49.7	2	1.0		T	
15 Nov		eP	10	12	35.0	1	1.0		T	
		e		14	21.1		1.4			
15 Nov		eP	13	54	18.3	17	1.1		T	Samoa Islands region 15.3 S 173.3 W h about 34 km 0 = 13 41 37.8
15 Nov		eP	16	26	09.7	2	1.0		R	Indefinite start
	N	eSur		27	04.5		1.0			
15 Nov		eP	17	19	16.5	1	0.7		T	Weak surface waves on LP - - may be separate.
	LPE	eSur	18	10	16					
15 Nov		eP	19	40	02.4	10	1.1		T	Tonga Islands 21.1 S 175.8 W h about 25 km 0 = 19 26 51.5 Strong surface waves on LP.
	LPN	eS		51	12		19.0			
	LPN	ePS		52	13		20.0			
	LPN	eSS		57	09		25.0			
	LPN	eSSS	20	00	55		28.0			
	LP	eSur		09	54					
15 Nov		eP'	22	20	32.8	2	1.0		T	Sandwich Islands 56.6 S 25.7 W h about 41 km 0 = 22 01 43.8 Indefinite start. Strong surface waves, Rayleigh type, on LP.
	LP	eSur	23	30	11					

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
16 Nov		eP	02	19	44.3	1	0.6		T	
16 Nov		eP	08	25	58.2	20	0.9		T	Near coast of Dominican Republic
		e		26	12.9		0.9			18.6 N 68.9 W
		epP			29.4		1.1			h about 147 km
		e(PP)			45.3		1.3			0 = 08 19 54.3
		e		27	20.7		0.9			
		e		28	20.0		0.7			
		ePcP			51.1		0.6			
		e(S)		30	53.6		1.2			
		eScP		32	21.8		1.2			
16 Nov		eP	12	30	19.8	1	0.8		T	
		e			49.0		1.0			
		e		31	11.0		0.9			
16 Nov		eP	16	17	44.2	3	1.1		T	Loyalty Islands region 20.2 S 172.9 E h about 32 km 0 = 16 03 54.8 Strong surface on LP.
	LP	eSur		50	37					
16 Nov		eP	17	51	59.6	6	1.2		T	
		e		52	54.1		1.2			
16 Nov		eP	18	00	47.9	1	0.3		NR	Quarry blast near Chico, Texas
		eS		01	09.8	999				$\triangle$(S-P) = 1.7°
16 Nov		eP	20	55	45.9	3	1.1		T	
		e		57	44.0		0.9			
		e	21	04	46.4		0.7			
16 Nov		eP	21	09	00.9	2	0.3		NR	$\triangle$(S-P) = 1.4°
	E	eS			19.4		0.4			
16 Nov		eP	22	13	46.7	2	0.4		NR	$\triangle$(S-P) = 1.5°
	E	eS		14	05.9		0.4			

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
16 Nov		eP	23	38	56.9	1	0.3	NE	NR	Quarry blast in
	E	eS		39	28.8		0.4			Keystone Dam area, Okla.
										△(S-P) = 2.6°
17 Nov		eP	02	06	15.0	3	0.8		T	
17 Nov		eP	03	34	49.0	1	0.6		T	
17 Nov		eP	04	06	00.3	3	0.9		T	
		e			08.3		0.7			
17 Nov		eP	06	35	32.7	1	0.6		T	
17 Nov		eP	08	26	00.7	9	0.9		T	Fiji Islands
										17.7 S 178.6 W
										h about 598 km
										0 = 08 13 49.8
17 Nov		eP	11	33	09.6	4	1.0		T	
17 Nov		eP	11	42	43.0	2	1.0		T	
17 Nov		eP	12	05	44.8	2	1.0		T	
17 Nov		eP	13	16	02.1	3	1.1		T	
		e			15.3		1.0			
		e			19.4		0.9			
17 Nov		eP	14	58	03.5	7	0.7	SE	T	Foreshock of following
										event in Aleutian Islands.
17 Nov		eP	14	58	18.1	9	0.8		T	Fox Islands, Aleutians
		ePcP		59	27.3		0.7			52.4 N 170.7 W
		e	15	05	22.8		0.8			h about 27 km
	LPN	eSur		14	40					0 = 14 49 03.0
	LP	eSur		16	21					Weak surface waves on LP
17 Nov		eP	19	16	39.5	9	0.9		T	Tonga Islands region
		epP		17	33.5		1.5			19.6 S 175.5 W
		e			46.2		1.2			h about 220 km
										0 = 19 03 55.4

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
17 Nov		eP	22	42	50.3	4	1.2		T	
17 Nov		eP	23	31	56.7	2	0.3	SE	NR	Quarry blast near
		eS		32	18.1	999				Chico, Texas
										△(S-P) = 1.7°
18 Nov		eP	03	22	22.4	1	0.7		R	Kern County, California
		e		23	30.2		1.0			35.4 N 117.8 W
	N	eSur		26	43.2		3.0			h about 23 km
	LPN	eSur			49					0 = 03 18 35.5
										Strong surface waves
										on LP, IB, and SP -
										Medium surface on BB.
										Mag. 4 (Pas.)
18 Nov		eP	03	31	13.3	2	0.6		T	Romania
										45.4 N 25.6 E
										h about 98 km
										0 = 03 18 41.0
18 Nov		eP'	06	21	36.9	2	1.0		T	Halmahera region
	LP	ePP		23	18		19.0			0.9 S 126.9 E
		e			36.2		1.3			h about 38 km
	LPE	e		30	17		15.0			0 = 06 02 34.3
	LP	eSP		33	24		22.0			Strong surface waves,
	LPN	eSS		40	30		30.0			Love and Rayleigh type,
	LPN	e(PKPPKS)		43	06		30.0			on LP.
	LPN	eSSS		45	13		30.0			
	LPE	e(PKPSKS)		47	30		20.0			
	LPE	e		48	55		30.0			
	LPE	e		51	22		27.0			
	LPN	eSur		55	33					
	LP	eSur	07	03	26					
18 Nov		eP	07	41	15.4	2	0.8		T	Sandwich Islands
		eP'		46	33.6	2	1.0			56.2 S 25.2 W
										h about 25 km
										0 = 07 27 40.3
										Initial arrival is
										P diffracted.

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
18 Nov		eP	09	14	52.2	1	0.7		T	
18 Nov		eP	10	42	48.4	27	1.4		T	Peru
		e		43	20.0		1.2			8.8 S 74.7 W
		e			37.8		0.9			h about 50 km
		ePcP		44	10.8		0.6			0 = 10 34 05.8
		e		45	12.8		0.8			
		eS		49	41.2		2.4			
	N	e		50	44.4		2.0			
18 Nov		eP	11	30	18.8	6	1.1		T	Kermadec Islands region
		e			34.7		1.2			27.0 S 176.3 W
		ePP		34	20.8		1.7			h about 61 km
	LPN	eSKS		40	56		16.0			0 = 11 16 56.8
	LPN	e(S)		41	43		18.0			Strong surface waves,
	LPN	ePS		43	01		20.0			Love and Rayleigh type,
	LPN	ePPS			47		23.0			on LP.
		ePKKP		47	10.0		1.0			Medium surface waves,
	LPN	eSS		48	20		23.0			Rayleigh type, on BB.
	LPE	eSur		58	00					
	LP	eSur	12	02	04					
18 Nov		eP	12	00	57.6	2	0.7		T	Tonga Islands region
		epP		01	31.2		1.0			21.4 S 175.8 W
										h about 114 km
										0 = 11 47 56.6
18 Nov		eP	18	28	19.3	16	1.6		T	Weak surface waves,
	LP	eSur		56	00					Rayleigh type, on LP.
18 Nov		eP	18	55	24.8	12	1.4		T	Possible P'P' of
		e			31.5		0.9			previous event, and
										possible new event
										at 18 55 31.5
18 Nov		eP	21	52	04.4	8	0.6	NNW	L	Quarry blast near
		eS			09.0	999				Carnegie, Okla.
										$\triangle$(S-P) = less than 0.1°

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
18 Nov		eP	22	24	31.9	2	0.8		T	Near coast of Formosa
		e			51.7		0.9			23.7 N 121.8 E
		eP'		28	47.6	2	0.7			h about 60 km
		ePP			58.8		1.4			0 = 22 09 53.4
		e		29	30.0		1.4			Medium surface waves,
		$ePKKP_1$		39	20.4		1.0			Rayleigh type, on LP.
		$ePKKP_2$			30.6		0.9			Initial arrival is
	LP	eSur	23	04	48					P diffracted.
19 Nov		eP	00	10	41.7	1	0.5		R	Indefinite start
		eSur		12	02.0		1.2			
19 Nov		eP	00	20	33.4	1	0.6		T	
19 Nov		eP	00	45	00.2	15	1.0		T	Andreanof Islands,
		e			09.7		0.9			Aleutian Islands
		e		46	11.1		0.9			51.6 N 178.5 W
	LPN	eS		52	57		20.0			h about 68 km
	LPN	eSur	01	01	49					0 = 00 35 14.1
	LP	eSur		05	09					Medium surface waves
		eP'P'		14	47.1		1.2			on LP.
19 Nov		eP	06	25	02.8	3	1.0		T	
19 Nov		eP	06	54	40.3	3	1.1		T	
19 Nov		eP	06	59	44.6	3	1.1		T	
		e	07	00	22.8		1.0			
19 Nov		eP	07	40	04.4	2	0.8		T	
		e			19.3		0.8			
19 Nov		eP	08	12	35.1	40	1.5		T	West of Galapagos Islands
		e			51.0		1.1			4.3 S 101.7 W
		e		15	36.1		1.7			h about 25 km
	LPN	eS		18	29		18.0			0 = 08 05 07.4
	LPN	eSur		21	07					Strong surface waves,
	LP	eSur		26	39					Rayleigh type, on LP.
										Medium surface on BB.

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
19 Nov		eP	08	44	43.3	3	1.1		T	
19 Nov		eP	09	07	18.1	2	1.0		T	
19 Nov		eP	20	52	45.3	29	2.0		T	
19 Nov		eP	21	00	33.9	3	0.7		T	
		e			41.0		0.8			
19 Nov		eP	22	39	20.6	4	0.6	SSE	R	
		e			37.6		0.5			
		eSur		43	07.6		0.7			
19 Nov	LP	eSur	22	51	40				T	Medium surface waves on LP.
19 Nov		eP	23	24	59.7	1	0.3	NE	NR	Probable quarry blast
	E	eS		25	32.3		0.5			near Keystone Dam area, Oklahoma
										△(S-P) = 2.4°
19 Nov		eP	23	38	06.3	3	1.0		T	Northern Celebes
		eP'		40	41.3	10	0.8			0.8 N 124.3 E
		epP'		41	31.0		1.3			h about 157 km
		e		42	03.1		0.8			0 = 23 21 55.5
		ePP			38.0		1.3			Strong surface waves,
	LP	e(SKP)		43	39		20.0			Rayleigh type, on LP.
		e			40.0		1.0			Initial arrival is
		eSKP		44	01.3		0.8			P diffracted.
		e		45	01.8		0.7			Possible new event
	LP	e(PPP)			29		14.0			at 23 43 40.0
		e			59.0		0.7			
		e		46	29.1		0.9			
	N	eSKS		47	30.6		1.0			
	LPN	e		49	41		25.0			
		ePKKP		50	11.8		0.9			
		e			32.5		1.0			
	LP	e		52	09		17.0			
		e		53	07.0		0.9			

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DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
	LP	eSKKP			45		17.0			
	LP	e		55	29		18.0			
	LPN	eSS		59	29		26.0			
20 Nov	LPN	eSSS	00	03	59		20.0			
	LPN	e		07	49		30.0			
	LPN	eSur		14	14					
	LP	eSur		20	09					
20 Nov		eP	02	09	37.7	2	0.6		T	
20 Nov		eP	04	17	12.3	5	0.8		T	Outer Mongolia -
		epP			26.6		0.8			Siberia border
		e		18	03.9		0.9			50.9 N 92.5 E
		e			58.9		1.1			h about 53 km
										0 = 04 03 55.7
20 Nov		eP	04	45	24.4	4	1.0		T	Near east coast of
		epP			41.8		1.0			Honshu, Japan
	LPN	ePS		57	17		24.0			37.3 N 141.3 E
	LPN	e		59	14		20.0			h about 83 km
	LPN	e	05	00	19		20.0			0 = 04 32 36.9
	LPN	e		03	34		20.0			
20 Nov		eP	06	51	11.3	5	0.6		T	Near east coast of
		e			19.5		1.0			Kamchatka
	LPN	e	07	11	10		30.0			54.7 N 161.8 E
										h about 71 km
										0 = 06 40 20.9
20 Nov		eP	08	13	05.7	2	0.5		R	
		e			07.8		0.7			
		e			11.2		0.5			
		e			14.3		0.6	SSE		
		e			25.3		0.5			
		e			34.1		0.5			
		e			39.6		0.5			
		e			41.8		0.6			
		eSur		16	23.6		0.7			
	E	eSur			58.4		0.9			

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
20 Nov		eP	08	57	17.0	2	1.0		R	Orange County, California
		e			27.2		0.9			33.7 N 117.9 W
	N	eSur	09	02	02.2		2.5			h about 17 km
	LPN	eSur			09					0 = 08 53 35.1
										Mag. 4 (Pas.)
										Weak surface waves
										on LP.
										Surface at 09 02 02.2
										is Lg.
20 Nov	LP	eP	11	58	22	3,600	18.0		T	Loyalty Islands region
	LP	ePP	12	02	38		21.0			21.8 S 169.9 E
	LP	e		08	09		14.0			h about 33 km
	LPN	eSKS		09	02		24.0			0 = 11 44 19.4
	LPN	eS		10	09		14.0			Strong surface waves,
	LPN	ePS		11	48		24.0			Rayleigh type, on LP
	LPN	ePPS		12	47		22.0			and BB.
	LPN	eSS		17	13		28.0			
	LPN	eSSS		20	55		26.0			
	LPN	eSKKS		21	29		23.0			
	LPN	e		24	09		23.0			
	LP	e		27	29		30.0			
	LPE	e		29	03		28.0			
	LP	eSur		33	06					
20 Nov		eP	13	32	54.8	6	0.8	SE	R	Surface at 13 36 38.3
		e		33	08.3		1.0			is Lg.
		e			18.3		0.7			$\triangle$(Lg-P) = 12.7°
		e		36	21.1		0.8			
	E	eSur			38.3		0.8			
20 Nov		eP	13	34	15.0	2	0.7		T	
20 Nov		eP	14	50	57.7	160	0.8	SE	T	[$\triangle$(S-P) = 33°]
		e		51	12.8		0.9			Medium surface waves,
		e		54	30.0		0.7			Rayleigh type, on LP.
	LPN	eS		56	14		20.0			
	LP	eSur	15	00	27					

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
20 Nov		eP	15	09	44.3	3	1.2		T	
20 Nov		eP	15	12	17.1	2	1.0		T	
20 Nov		eP	16	08	08.2	3	1.0		T	
20 Nov		eP	18	06	55.1	114	1.6		T	North Atlantic Ocean
		epP		07	07.7		1.9			31.3 N 40.9 W
		e			43.1		2.2			h about 44 km
	BB	ePP		08	54		8.0			0 = 17 58 17.5
	BB	e		09	54		8.0			Strong surface waves,
	BBE	ePcS		12	32		6.0			Love and Rayleigh type,
	LPN	eS		13	59		18.0			on LP.
	LPE	eS		17	34		22.0			Strong Rayleigh type on BB.
	LP	eSur		19	47					
	LP	eSur		20	35					
		eP'P'		38	20.4		0.8			
20 Nov		eP	19	37	23.6	1	0.8		T	
20 Nov		eP	20	23	09.1	2	0.8		T	
20 Nov	LP	eSur	20	38	14				T	Weak surface waves on LP.
20 Nov		eP	21	01	23.6	3	0.8		T	
20 Nov		eP	21	22	55.3	1	0.3	SSE	NR	Quarry blast near
		e			56.6		0.3			Chico, Texas
		e			58.0		0.3			$\triangle$(S-P) = 1.7°
		e		23	05.0		0.3			
	E	eS			16.5		0.5			
	E	e			17.7		0.3			
	E	e			19.4		0.5			
20 Nov		eP	22	10	49.7	2	0.4	SSE	NR	Quarry blast near
		e			51.5		0.3			Chico, Texas
	E	eS		11	11.0		0.4			$\triangle$(S-P) = 1.6°
	E	e			13.8		0.3			
		e			25.0		1.0			

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
20 Nov		eP	23	20	25.8	2	0.8		T	South of Honshu, Japan
		e		21	06.0		1.0			28.3 N 138.9 E
		epP		22	18.1		0.7			h about 525 km
										0 = 23 07 47.5
20 Nov		eP	23	24	32.3	2	0.8		T	
20 Nov		eP	23	28	56.5	1	0.3	SSE	NR	Quarry blast near
	E	eS		29	18.1		0.3			Chico, Texas
	E	e			20.6		0.5			△(S-P) = 1.7°
20 Nov		eP	23	47	32.1	1	1.0		T	
20 Nov		eP	23	55	14.1	1	0.4		NR	Quarry blast near
		e			16.7		0.3			Chico, Texas
		e			24.1		0.4			△(S-P) = 1.7°
	E	eS			36.1		0.3			
	E	e			38.8		0.3			
21 Nov		eP	01	08	42.0	1	0.7		T	
		e			53.3		1.1			
21 Nov		eP	01	28	56.8	2	0.9		T	Northern Hokkaido, Japan
		e		29	31.8		0.6			43.8 N 145.3 E
										h about 165 km
										0 = 01 16 50.2
21 Nov		eP	01	29	50.3	4	0.8	NE	T	
		e		30	01.6		0.9			
21 Nov		eP	01	56	54.7	1	0.6		T	
21 Nov		eP	02	28	57.1	1	0.7		T	
21 Nov		eP	02	39	21.0	3	0.8		T	
		e			30.1		0.8			
21 Nov		eP	02	53	47.4	3	0.8		T	

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
21 Nov		eP	05	55	24.3	1	0.7		T	
21 Nov		eP	06	46	29.4	1	0.6		T	Near coast of Venezuela
		e			40.7		0.7			10.6 N 62.8 W
		epP			50.6		0.8			h about 70 km
		e			55.6		0.8			0 = 06 38 51.1
21 Nov		eP	07	13	04.6	1	0.6		T	
		e			14.8		0.7			
21 Nov		eP	07	26	19.0	1	0.7		T	
		e			49.8		1.0			
		e			57.1		1.0			
21 Nov		eP	08	11	31.7	1	0.5		T	Windward Islands
										11.6 N 61.9 W
										h about 86 km
										0 = 08 03 58.9
21 Nov		eP	08	21	40.3	1	0.7		T	
21 Nov		eP'	11	25	35.5	1	0.9		T	Northern Celebes
		e			59.1		0.9			0.9 N 122.5 E
		e		28	46.4		1.0			h about 85 km
	LP	eSur	12	07	00					0 = 11 06 38.1
										Weak surface waves, Rayleigh type, on LP.
21 Nov		eP	14	00	10.3	2	0.8		T	
21 Nov		eP	14	41	32.7	1	0.6		T	
21 Nov		eP	17	16	07.3	1	0.8		T	
		e			19.7		0.8			
21 Nov		eP	18	02	13.0	2	0.4	ENE	NR	△(S-P) = 2.3°
	N	eS			41.7		0.5			

DATE	Syst.	Phase	Arrival Time G.C.T.			Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h.	m.	s.					
21 Nov		eP'	18	24	50.2	3	0.8		T	Indian Ocean
		eP'2		25	11.5	3	0.8			13.4 S 66.1 E
										h about 25 km
										0 = 18 04 50.9
21 Nov		eP	19	54	22.2	3	0.9		T	
21 Nov		eP	20	11	04.7	3	0.3	SE	NR	Quarry blast near
		e			07.0		0.5			Chico, Texas
		e			14.5		0.4			$\triangle$(S-P) = 1.6°
		eS			26.0	999				
21 Nov		eP	20	18	28.3	1	0.6		T	
21 Nov		eP	20	28	11.8	6	0.9		T	Southern Alaska
										62.6 N 156.5 W
										h about 154 km
										0 = 20 20 05.4
21 Nov		eP	21	12	21.5	1	0.3		NR	$\triangle$(S-P) = 1.4°
	E	eS			40.4		0.4			
21 Nov		eP	23	17	58.4	1	0.7		T	
22 Nov		eP	02	03	37.6	2	0.7		T	
22 Nov		eP	02	38	18.6	1	0.8		T	
22 Nov		eP	03	53	03.0	5	0.8	SE	T	Phase at 03 53 23.9
		e			23.9		0.7			Possible new event
		e			31.8		1.0			
22 Nov		eP	03	56	58.5	2	0.8		T	
22 Nov		eP	08	55	17.6	3	1.0		T	
		e			24.9		1.1			
		e			45.4		1.2			

DATE	Syst.	Phase	Arrival Time G.C.T.			Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h.	m.	s.					
22 Nov		eP	10	27	57.8	1	0.6		T	Andreanof Islands,
										Aleutian Islands
										51.4 N 174.7 W
										h about 25 km
										0 = 10 18 21.8
22 Nov		eP	11	18	31.3	1	0.7		T	
22 Nov		eP	12	34	34.9	55	0.6		R	Mexico-Guatemala
		e		35	12.2		0.9			border
		e			33.4		0.9			15.4 N 91.7 W
	E	eSur		38	26.4		1.4			h about 84 km
	LPN	eSur		39	10					0 = 12 30 01.9
										Medium surface waves
										on SP, IB, BB and LP.
22 Nov		eP	13	08	27.0	24	1.1		T	South of Panama
		e			35.5		0.9			2.7 N 84.8 W
		e			42.5		1.1			h about 37 km
		ePcP		11	10.0		0.7			0 = 13 01 40.1
22 Nov		eP	20	52	38.7	2	0.8		T	Kermadec Islands
		e			52.0		0.9			region
										26.8 S 176.6 W
										h about 77 km
										0 = 20 39 18.6
22 Nov		eP	20	59	31.6	7	0.7	NE	T	
22 Nov		eP'	22	50	30.6	1	0.6		T	Near south coast of Java
		e(PcPP')	23	02	05.0		0.6			8.8 S 110.5 E
										h about 188 km
										0 = 22 30 52.1
22 Nov		eP	23	23	37.0	3	1.0		T	
23 Nov		eP	01	23	54.0	9	0.9		T	

DATE	Syst.	Phase	Arrival Time G.C.T.			Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h.	m.	s.					
23 Nov		eP	04	54	38.2	2	0.6		T	
		e			51.9		0.8			
23 Nov		eP	10	41	29.4	3	0.7		T	Costa Rica-Nicaragua border
		e(pP)		42	07.3		0.8			11.1 N 84.7 W
		e		43	07.6		1.2			h about 234 km
		e		44	01.4		1.0			0 = 10 36 11.0
		e			48.4		0.9			
23 Nov		eP	11	25	27.7	2	0.6		T	Near coast of Peru
		epP			44.2		0.6			5.5 S 80.5 W
		ePcP		27	13.8		0.7			h about 60 km
										0 = 11 17 25.5
23 Nov		eP	12	16	01.1	1	0.7		T	
		e			11.4		1.0			
23 Nov		eP	15	59	33.5	9	1.2		T	Weak surface waves
	LPN	eSur	16	27	52					on LP
23 Nov		eP	16	52	55.7	7	1.4		T	
23 Nov		eP	16	54	22.0	19	1.5		T	Possible phase of previous event
23 Nov		eP	16	57	02.7	1	1.0		T	
		e		58	14.5		1.4			
23 Nov		eP	17	12	02.5	3	0.9		T	
23 Nov	LP	eSur	18	06	00				T	Weak surface waves on LP
23 Nov		eP	18	08	39.3	1	0.6		T	
24 Nov		eP	00	32	41.5	2	1.0		T	
24 Nov		eP	01	42	37.1	3	1.0		T	

DATE	Syst.	Phase	Arrival Time G.C.T.			Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h.	m.	s.					
24 Nov		eP	07	55	22.1	4	1.0		T	
		e			30.4		1.0			
24 Nov		eP	09	09	49.4	3	0.9		T	
24 Nov		eP	11	19	32.6	1	0.6		T	
24 Nov		eP	13	07	53.1	1	0.7		T	
24 Nov		eP	19	40	12.6	1	0.7		T	
24 Nov		eP	22	36	39.4	3	1.0		T	
24 Nov		eP	22	48	33.1	2	0.6		T	
24 Nov		eP	23	43	17.6	1	0.5	ENE	NR	$\triangle$(S-P) = 3.1°
		e			21.0		0.6			
		e			24.5		0.6			
	E	eS			55.5		0.4			
	E	e		44	08.4		0.4			
25 Nov		eP	02	26	28.4	4	0.6		T	
25 Nov		eP	06	01	15.2	2	0.7		T	
25 Nov		eP	07	07	42.5	1	0.6		T	
25 Nov		eP	10	17	14.7	1	0.6		T	
25 Nov		eP'	14	29	40.3	2	0.7		T	Solomon Islands
		e			57.1		0.7			6.3 S 154.8 E
		ePP		30	13.7		1.0			h about 83 km
		e			45.7		1.0			0 = 14 11 23.2
		$ePKKP_1$		41	00.1		0.6			Medium surface waves,
		$ePKKP_2$			11.8		0.8			Rayleigh type, on LP,
		e			28.9		1.2			at 15 00 50
	LPN	eSur		57	15					
	LP	eSur	15	00	50					

DATE	Syst.	Phase	Arrival Time G.C.T.			Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h.	m.	s.					
25 Nov		eP	15	28	34.2	1	0.6		T	
25 Nov	LP	eSur	16	21	35					Weak surface waves, Rayleigh type, on LP.
25 Nov		eP	17	47	43.2	2	0.7		T	
25 Nov		eP	20	13	32.4	4	1.0		T	
		e			38.7		1.5			
		e			45.5		1.0			
		e			53.0		0.9			
25 Nov		eP	20	23	38.0	2	1.0		T	
25 Nov		eP	20	32	45.4	15	1.5		T	Near east coast of
		epP			57.8		1.6			Honshu, Japan
	LPN	eS		43	35		21.0			36.4 N 141.4E
	LPN	e		51	59		35.0			h about 64 km
	LPN	e		57	05		30.0			0 = 20 19 50.7
	LPN	e(SKKKS)		59	40		30.0			Strong surface waves,
	LP	eSur	21	05	20					Rayleigh type, on LP.
25 Nov		eP	21	01	42.4	23	1.0	SE	T	
25 Nov		eP	22	02	48.4	5	1.1		T	
25 Nov		eP	22	40	43.7	4	0.8	ESE	T	
25 Nov		eP	22	47	37.7	3	0.9		T	
25 Nov		eP	23	07	58.1	7	0.8		T	Tonga Islands
		e		08	11.0		0.7			22.3 S 175.5 W
										h about 25 km
										0 = 22 54 46.3
25 Nov		eP	23	19	46.7	2	0.6		T	
26 Nov		eP	07	28	26.1	4	1.1		T	

DATE	Syst.	Phase	Arrival Time G.C.T.			Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h.	m.	s.					
26 Nov		eP	08	37	13.2	2	1.0		T	
26 Nov		eP	09	36	41.4	2	0.9		T	
26 Nov		eP	09	38	57.4	1	0.7		T	
26 Nov		eP	09	46	13.3	2	0.8		T	
25 Nov		eP	10	05	30.2	8	0.9		T	Possible new event
		e		07	02.9		1.4			at 10 07 02.9
		e			32.8		1.0			Strong surface waves,
	LPN	eS		10	55		20.0			Love and Rayleigh type,
	LPN	eSur		13	00					on LP.
	LP	eSur		15	00			SE		$\triangle$(S-P) = 34°
26 Nov		eP	10	19	04.4	4	1.0		T	
26 Nov		eP	10	57	52.8	1	0.6		T	
26 Nov		eP	11	09	04.7	1	0.7		T	
26 Nov		eP	12	26	25.3	1	0.8		T	
26 Nov		eP	12	30	23.4	6	0.9		T	Aftershock of event
		e		31	22.8		0.9			at 10 05 30.2
	LPN	eS		36	00		26.0			$\triangle$(S-P) = 34°
	LPN	e(Sur)		38	45					Weak surface waves,
	LPN	eSur		40	25			SE		(Love) and Rayleigh
										type, on LP.
26 Nov		eP	14	02	18.6	1	0.7		T	
26 Nov		eP	14	26	10.5	7	0.8		T	North Atlantic Ocean
	LPN	eSur		36	35					30.7 N 44.1 W
	LPN	eSur		40	30					h about 39 km
										0 = 14 17 50.5
										Medium surface waves,
										Love and Rayleigh, on LP.

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
26 Nov		eP	14	38	33.4	18	1.2		T	Strong surface waves,
		e			44.3		2.0			Love and Rayleigh type,
		e		40	22.2		1.2			on LP.
	LPN	eSur		48	45					
	LP	eSur		52	00			NNE		
26 Nov		eP	16	00	10.6	2	0.9		T	
26 Nov		eP	16	05	54.7	11	1.5		T	
27 Nov		eP	00	08	26.9	2	0.9		T	
27 Nov		eP	00	41	28.2	2	1.0		T	
27 Nov		eP	00	51	38.2	1	0.4	ENE	NR	Probable blast in
	E	eS		52	09.8		0.5			Keystone Dam area, Okla.
										Δ(S-P) = 2.6°
27 Nov		eP	00	57	33.5	1	0.4		R	Colorado
		e			36.0		0.5			38.9 N 106.1 W
		e			47.9		0.4			h about 19 km
	E	e			58.4		0.5			0 = 00 55 44.3
		e		58	03.0		0.5			Surface is Lg.
		e			07.2		1.0			
		eSur		59	35.0	999				
		e	01	01	59.0		0.7			
27 Nov		eP	01	14	30.4	4	0.8	E	T	
27 Nov		eP	02	20	43.5	1	1.0		T	
27 Nov		eP	06	10	50.0	12	1.4		T	
		e		14	11.9		1.2			Near south coast of
		ePP			54.7		2.2			Kyushu, Japan
		e		15	15.6		1.9			31.6 N 131.1 E
		ePKKP		27	15.5		0.9			h about 25 km
		e			40.0		0.8			0 = 05 57 07.6
	LPN	ePSS		29	29		23.0			Mag. = 6-1/4 - 6-1/2 (Pas.)
	LPN	e		36	23		34.0			Strong surface waves
	LPN	e		39	07		33.0			on LP.
	LPN	eSur		41	37					
	LPN	eSur		44	00					

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
27 Nov		eP	06	48	44.9	1	1.0		T	
27 Nov		eP	07	12	43.7	3	1.0		T	
27 Nov		eP	07	26	10.5	3	1.1		T	
27 Nov		eP	07	40	11.4	1	0.6		T	
27 Nov		eP	07	52	59.4	6	1.0		T	
27 Nov		eP	08	02	38.1	2	1.0		T	
27 Nov		eP	08	25	41.8	1	1.0		T	
		e		26	16.6		1.0			
27 Nov		eP	08	28	20.8	2	0.9		T	
		e		29	25.9		1.1			
		e		30	33.8		0.9			
27 Nov		eP	09	12	25.5	2	1.0		T	
		e		13	53.5		1.5			
27 Nov		eP	09	19	32.7	3	1.0		T	
27 Nov		eP	09	28	00.8	46	2.0		T	
27 Nov		eP	09	28	33.7	8	1.2		T	
		e		31	47.7		1.2			
		e		36	13.7		0.9			
27 Nov		eP	09	50	23.4	4	1.2		T	
		e			46.4		0.8			
27 Nov		eP	09	54	02.9	3	1.0		T	
27 Nov		eP	10	04	25.4	6	1.3		T	
27 Nov		eP	10	08	32.5	5	1.2		T	

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
27 Nov		eP	10	10	17.1	3	1.0		T	
		e			48.9		1.2			
27 Nov		eP	10	29	06.0	2	0.9		T	
27 Nov		eP	10	43	34.4	3	1.0		T	
27 Nov		eP	10	48	39.9	3	1.1		T	
27 Nov		eP	11	00	54.0	1	0.8		T	
27 Nov		eP	11	09	22.5	3	1.0		T	
27 Nov		eP'	11	13	27.4	12	1.3		T	South of Australia
		eP'2			36.9		0.9			49.8 S 121.7 E
		e			42.7		0.8			h about 25 km
		e		14	06.7		1.0			0 = 10 53 45.2
		e		16	32.9		1.2			
27 Nov		eP	11	34	28.5	3	1.0		T	
27 Nov		eP	12	18	12.5	3	1.2		T	
27 Nov		eP	12	45	52.0	2	0.9		T	
		e		47	06.8		1.1			
27 Nov		eP	12	56	35.5	2	1.0		T	
27 Nov		eP	13	51	46.1	3	1.1		T	
27 Nov		eP	15	05	17.6	3	1.1		T	
27 Nov		eP	16	02	10.4	1	0.6		T	
		e			20.0		1.0			
27 Nov		eP	16	09	52.0	1	0.3		NR	$\triangle$(S-P) = 1.8°
	E	eS		10	14.5		0.3			
27 Nov		eP	17	09	17.7	3	1.0		T	

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
27 Nov		eP'	17	29	35.2	47	1.6		T	Halmahera region
		ePP		31	28.0		2.0			0.6 S 127.1 E
		e			40.2		2.1			h about 25 km
		e		34	48.1		1.0			0 = 17 10 33.3
		e		35	42.5		1.0			Mag. 6-1/4 - 6-1/2 (Pas.)
		ePKKP		39	14.1		1.3			Strong surface waves,
		e			19.6		1.3			Rayleigh type, on LP.
		eScSP		40	45.2		1.8			Weak surface on BB.
		e		41	57.2		1.2			
		eSKKP		43	08.5		1.4			
		e		46	37.0		1.0			
	LP	eSur	18	08	15					
27 Nov		eP	19	58	40.3	4	1.2		T	
27 Nov		eP	22	04	18.4	6	1.3		T	
27 Nov		eP	23	34	38.6	2	0.4	ESE	NR	Quarry blast near
	E	eS		35	00.2	999				Fitzhugh, Okla
										$\triangle$(S-P) = 1.7°
27 Nov		eP'	23	49	45.6	1	0.6		T	Balleny Islands region
28 Nov	LPN	e(SS)	00	08	37		25.0			60.6 S 156.9 E
	LP	eSur		30	00					h about 46 km
										0 = 23 30 46.4
										Medium surface waves,
										Rayleigh type, on LP
28 Nov		eP	00	49	30.1	1	0.6		T	Fiji Islands
										19.1 S 177.5 W
										h about 530 km
										0 = 00 37 12.3
28 Nov		eP	01	11	54.6	3	1.0		T	
28 Nov		eP	01	48	51.7	1	0.9		T	
28 Nov		eP	02	33	22.9	1	1.0		T	
28 Nov		eP	03	45	40.5	10	1.5		T	

DATE	Syst.	Phase	Arrival Time G.C.T.	Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h. m. s.					
28 Nov		eP	04 26 02.3	3	1.1		T	
28 Nov		eP	05 31 45.4	3	1.0		T	
28 Nov		eP	05 59 04.2	2	0.8		T	
28 Nov		eP	06 28 29.9	1	0.6		T	
28 Nov		eP	08 05 25.0	2	0.7		T	Kurile Islands 46.7 N 153.5 E h about 80 km 0 = 07 53 43.9
28 Nov		eP	09 11 35.6	2	0.7		T	Greece-Turkey border 40.6 N 26.5 E h about 119 km 0 = 08 58 51.3
		e	40.5		0.8			
28 Nov		eP	09 19 05.6	1	0.5		R	
		eSur	22 10.8		0.7			
28 Nov	LPE	e	09 42 30		30.0		T	Initial arrival not detected
	LPN	e	48 45		25.0			
	LPN	e	53 20		17.0			
28 Nov		eP'	10 33 30.0	2	0.8		T	India-Pakistan border 35.7 N 73.6 E h about 31 km 0 = 10 14 44.5
28 Nov		eP	13 45 23.2	3	1.0		T	
28 Nov		eP	16 50 52.2	4	1.0		T	Honshu, Japan 35.9 N 140.2 E h about 101 km 0 = 16 37 58.5
28 Nov		eP	17 39 36.5	2	0.7		T	

DATE	Syst.	Phase	Arrival Time G.C.T.	Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h. m. s.					
28 Nov		eP	18 52 09.4	1	0.8		T	
28 Nov		eP'	18 53 53.4	7	1.0		T	South of Tasmania 56.9 S 143.5 E h about 51 km 0 = 18 34 37.4 Medium surface waves, Rayleigh type, on LP.
	LP	eSur	19 36 00					
28 Nov		eP	20 08 25.8	3	1.2		T	
28 Nov		eP	20 49 16.0	1	1.0		T	
28 Nov		eP	21 05 25.6	2	0.3		L	$\triangle$(S-P) = 0.8°
		e	36.7		0.4			
	N	eS	38.2		0.6			
28 Nov		eP	22 06 40.6	4	1.3		T	
28 Nov		eP	22 32 54.5	2	0.9		T	
28 Nov		eP	23 30 29.5	2	0.3	SSE	NR	Quarry blast near Chico, Texas $\triangle$(S-P) = 1.7°
	E	eS	51.3	999				
28 Nov		eP	23 43 15.8	2	0.4	ENE	NR	Blast in Keystone Dam area, Oklahoma $\triangle$(S-P) = 2.5°
	E	eS	46.7		0.4			
29 Nov		eP	00 06 17.3	3	1.1		T	Weak surface waves on LP
		e	25.9		1.0			
	LP	eSur	27 10					
29 Nov		eP	04 23 47.5	2	1.0		T	
29 Nov		eP	04 27 38.4	2	1.0		T	
29 Nov		eP	04 54 48.4	23	1.2		T	Near coast of Chile 38.5 S 75.0 W h about 85 km 0 = 04 43 07.7

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
29 Nov		eP	05	17	03.8	3	1.0		T	
29 Nov	LPE	ePS	09	55	30		40.0		T	South Atlantic Ocean
	LPE	eSS	10	01	00		32.0			38.3 S 19.4 W
	LPN	eSur		12	00					h about 25 km
	LP	eSur		16	20					0 = 09 28 12.7
										Strong surface waves, Love and Rayleigh on LP.
29 Nov		eP	11	37	45.6	1	0.9		T	
29 Nov		eP	13	15	01.7	2	0.8		T	
29 Nov		eP	14	09	54.0	3	1.1		T	
29 Nov		eP	14	16	55.9	2	1.0		T	
29 Nov		eP	14	34	16.4	10	1.5		T	
29 Nov		eP	17	44	33.0	1	0.4	SE	NR	Quarry blast near
		e			41.8		0.4			Chico, Texas
	E	eS			53.8	999				$\triangle$(S-P) = 1.6°
29 Nov		eP	18	01	13.9	7	0.6		T	Near east coast of
		e			28.6		0.8			Kamchatka
										52.2 N 158.4 E
										h about 76 km
										0 = 17 50 05.6
29 Nov		eP	18	04	21.5	1	0.4	S	NR	$\triangle$(S-P) = 2.2°
	E	eS			48.2		0.4			
29 Nov		eP	20	14	05.2	1	0.6		T	
29 Nov		eP	20	33	23.9	3	0.2	NNW	L	$\triangle$(S-P) = 1.3°
	E	eS			42.3		0.3			
29 Nov		eP	20	46	36.6	11	0.9		T	North-central Peru
		e(pP)			44.9		0.8			6.9 S 75.9 W
										h about 25 km
										0 = 20 38 06.5

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
29 Nov		eP	20	53	41.9	1	0.2		L	$\triangle$(S-P) = less than 0.1°
	E	eS			45.6	999				
29 Nov		eP	21	06	36.1	2	0.6	N	NR	$\triangle$(S-P) = 2.2°
	N	eS		07	03.8		0.4			
29 Nov		eP	22	25	41.7	3	0.8		T	
29 Nov	LP	eSur	22	45	00				T	Southeast of Loyalty Islands
										23.1 S 170.9 E
										h about 29 km
										0 = 21 55 44.7
										Medium surface waves, Rayleigh type, on LP.
30 Nov	LP	eSur	00	10	40				T	North Island, New Zealand
										38.0 S 177.7 E
										h about 68 km
										0 = 23 16 09.1
										Weak surface waves, Rayleigh type, on LP.
30 Nov		eP	00	16	51.4	1	1.0		T	
30 Nov		eP	01	17	01.7	2	1.0		T	
30 Nov		eP	01	24	14.3	1	0.6		T	
30 Nov		eP	01	54	44.9	4	1.2		T	
30 Nov		eP	05	03	11.4	3	1.1		T	
30 Nov		eP	05	59	19.3	2	0.8		T	
30 Nov		eP	07	05	10.4	3	1.1		T	
30 Nov		eP	10	36	20.4	1	0.7		T	

DATE	Syst.	Phase	Arrival Time G.C.T.			Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h.	m.	s.					
30 Nov		eP	12	32	16.0	6	1.0		T	Near Vladivostok, U.S.S.R.
		e		34	05.0		1.2			43.8 N 132.1 E
		e		35	35.7		1.1			h about 469 km
										0 = 12 20 07.3
20 Nov	LPN	eSur	15	01	47				T	New Hebrides Islands region
										14.6 S 170.9 E
										h about 82 km
										0 = 14 14 35.5
										Weak surface waves on LP
30 Nov		eP	17	59	19.8	2	0.4	SE	NR	$\triangle$(S-P) = 1.7°
		eS			41.4	999				Blast near Chico, Texas
30 Nov		eP	20	28	57.2	5	0.6	E	NR	Quarry blast near
		e			59.0	999				Fitzhugh, Okla.
		e		29	07.0		0.4			$\triangle$(S-P) = 1.4°
		eS			18.9	999				
30 Nov		eP	21	32	11.0	1	0.5		R	
		e			20.5		0.6			
		e		33	06.8		0.6			
	E	eSur			37.2		0.9			
30 Nov		eP	23	35	19.6	2	0.4	SE	NR	$\triangle$(S-P) = 1.7°
	E	eS			41.5		0.3			
	E	e			44.2		0.4			
30 Nov		eP	23	48	09.6	1	0.4		NR	Quarry blast in
	E	eS			40.3		0.5			Keystone Dam area, Okla.
										$\triangle$(S-P) = 2.5°

APPENDIX

QUARRY BLAST SIGNALS

Numerous signals are recorded at WMSO from blasts detonated at rock quarries in Oklahoma and northern Texas. Figure 1 shows the locations of WMSO and the rock quarries from which seismic signals have been recorded and identified.

Representative signals from the quarries are shown in figure 2 through figure 5. Additional signals from quarry blasts will be included in subsequent reports as their sources are identified.

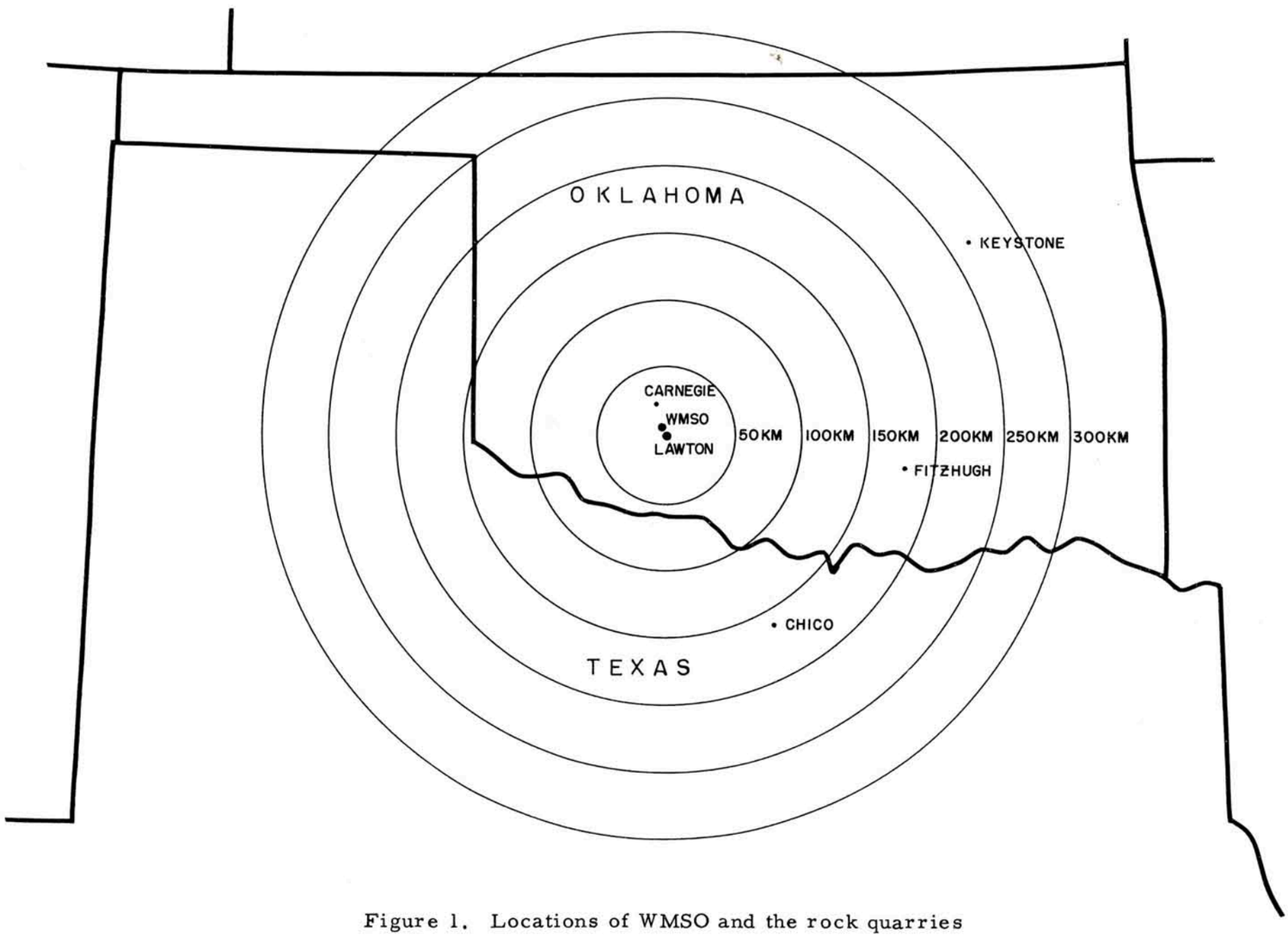

Figure 1. Locations of WMSO and the rock quarries

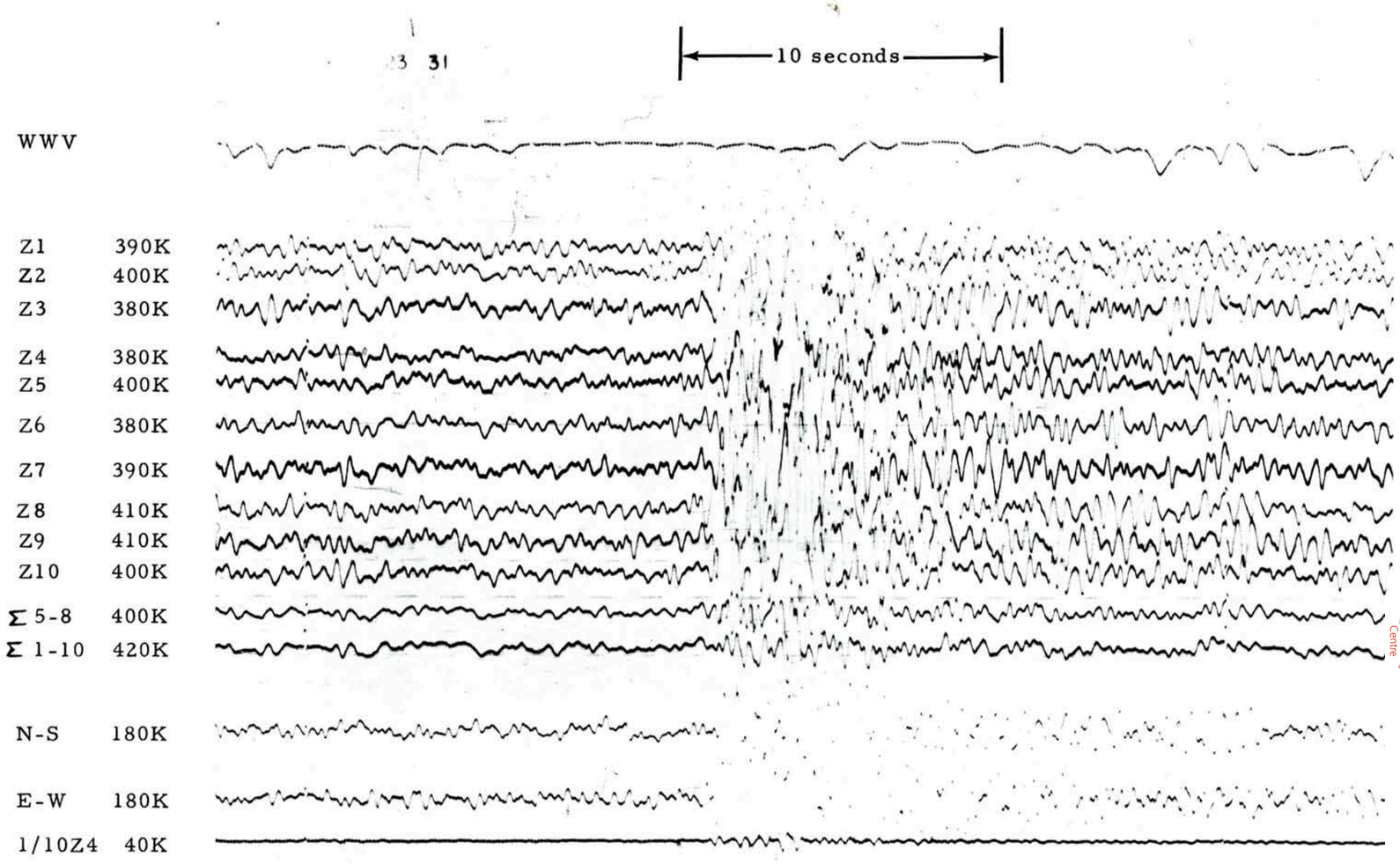

Figure 2. Representative signal from quarry near Chico, Texas

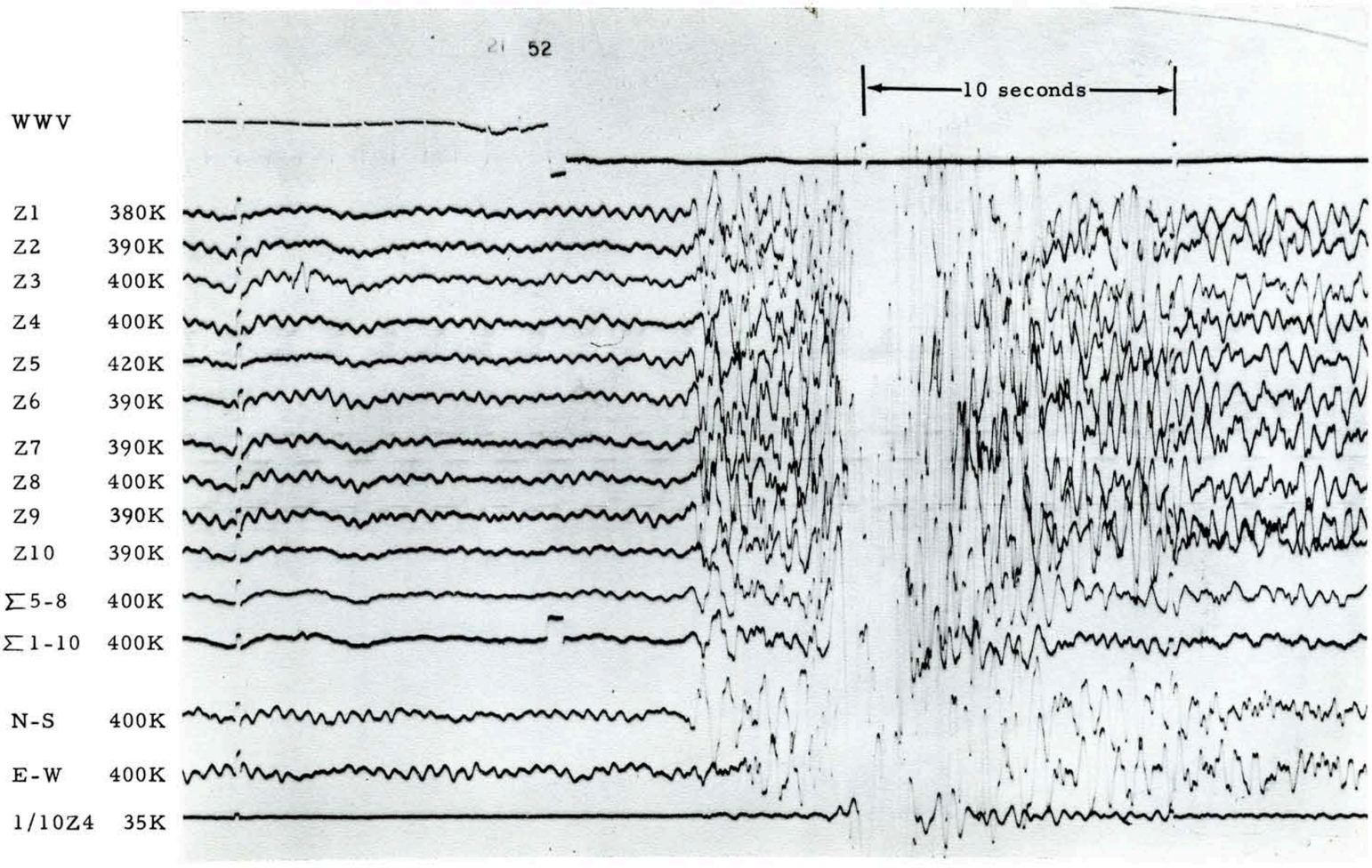

Figure 3. Representative signal from quarry near Carnegie, Oklahoma

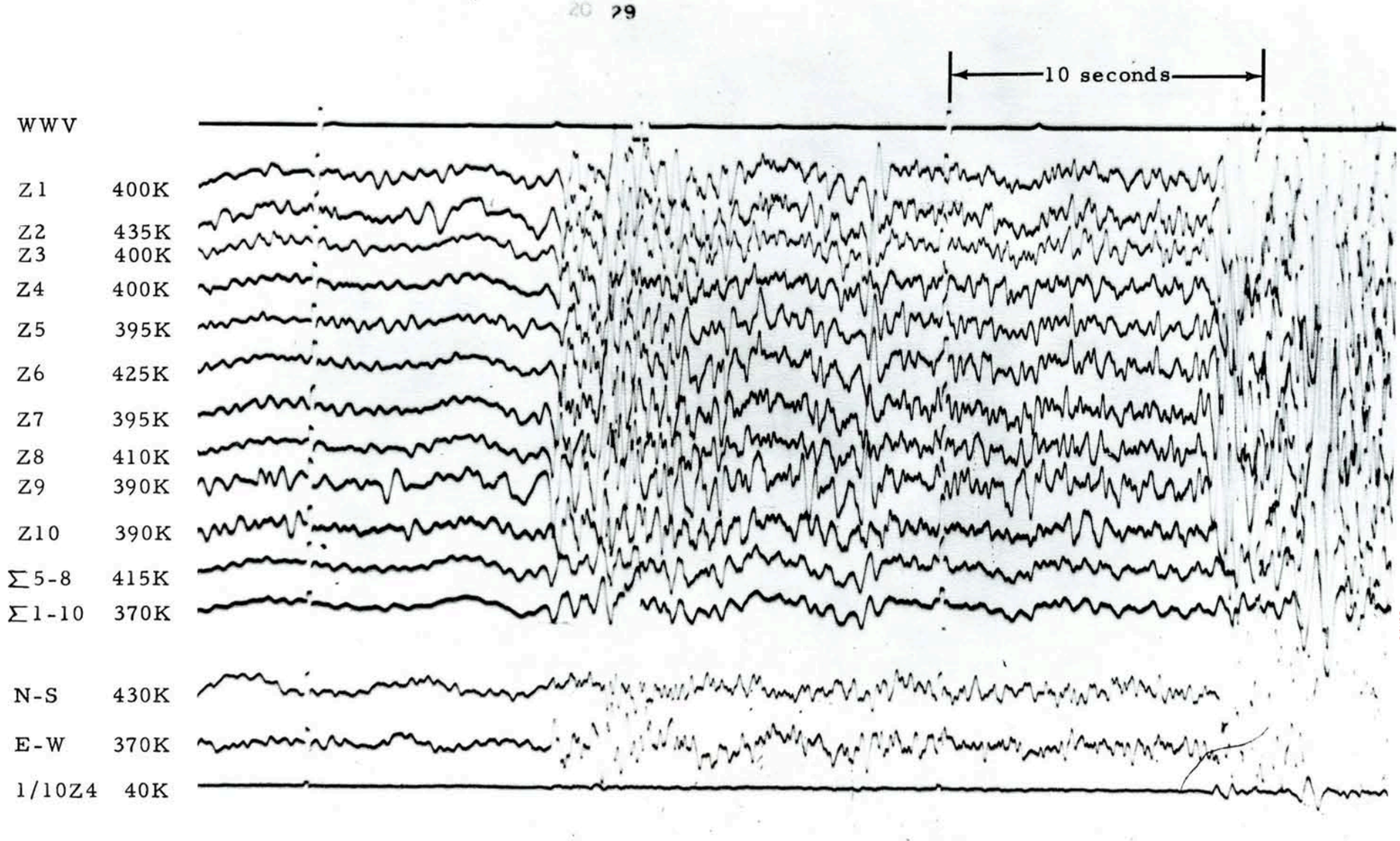

Figure 4. Representative signal from quarry near Fitzhugh, Oklahoma

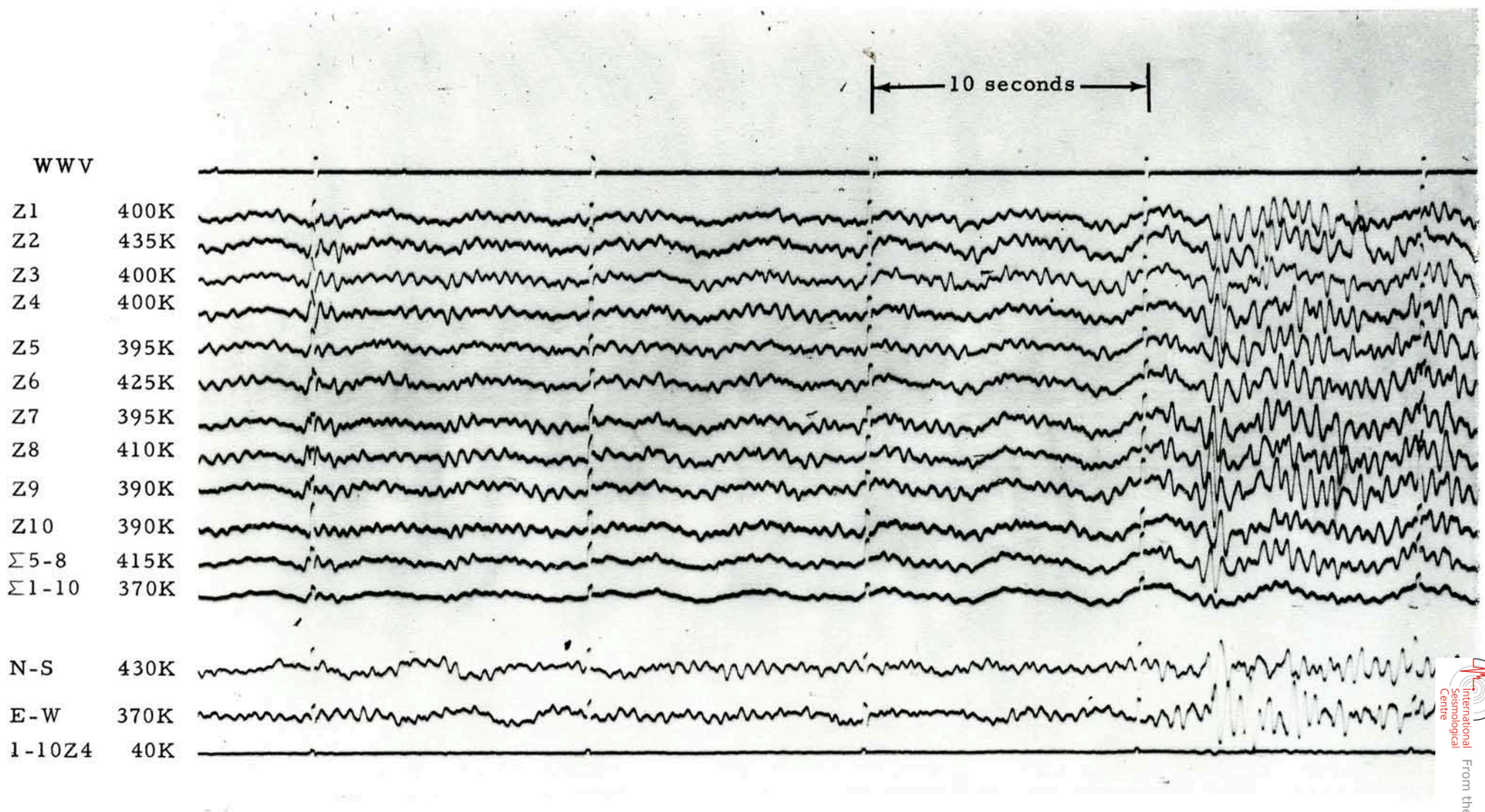

Figure 5. Representative signal from quarry in Keystone Dam area, Oklahoma

Volume I, No. 12
December 1961

REGISTRATION OF EARTHQUAKES AT WICHITA MOUNTAINS SEISMOLOGICAL OBSERVATORY FORT SILL, OKLAHOMA, U.S.A.

Operated under the Technical Supervision of the
Air Force Technical Applications Center (AFTAC)

by

The Geotechnical Corporation
Garland, Texas

Advanced Research Projects Agency (ARPA)
Department of Defense
United States Government

THE REGISTRATION OF EARTHQUAKES

AT THE

WICHITA MOUNTAINS SEISMOLOGICAL OBSERVATORY

STATION

Station Abbreviation: WMSO
Station Identification on Film Seismograms: a
Geographical Location *: 34° 43' 05.3" N. Lat.
(Vault No. 6) 98° 35' 20.7" W. Long.

GEOCENTRIC LOCATION *: 34° 32' 09.8" N. Lat.
(Vault No. 6) 98° 35' 20.7" W. Long.

ALTITUDE (Meters) *: 505 meters (1658)
(Vault No. 6)

GEOLOGY: The station is located on the Carlton (porphyritic) granophyre of the Wichita Mountains of Oklahoma.

NOISE LEVEL - December 1961: The periods of the predominant microseisms at WMSO are 0.5 second and 6 seconds. An amplitude distribution curve for the 0.5 second microseisms may be found on page 2.

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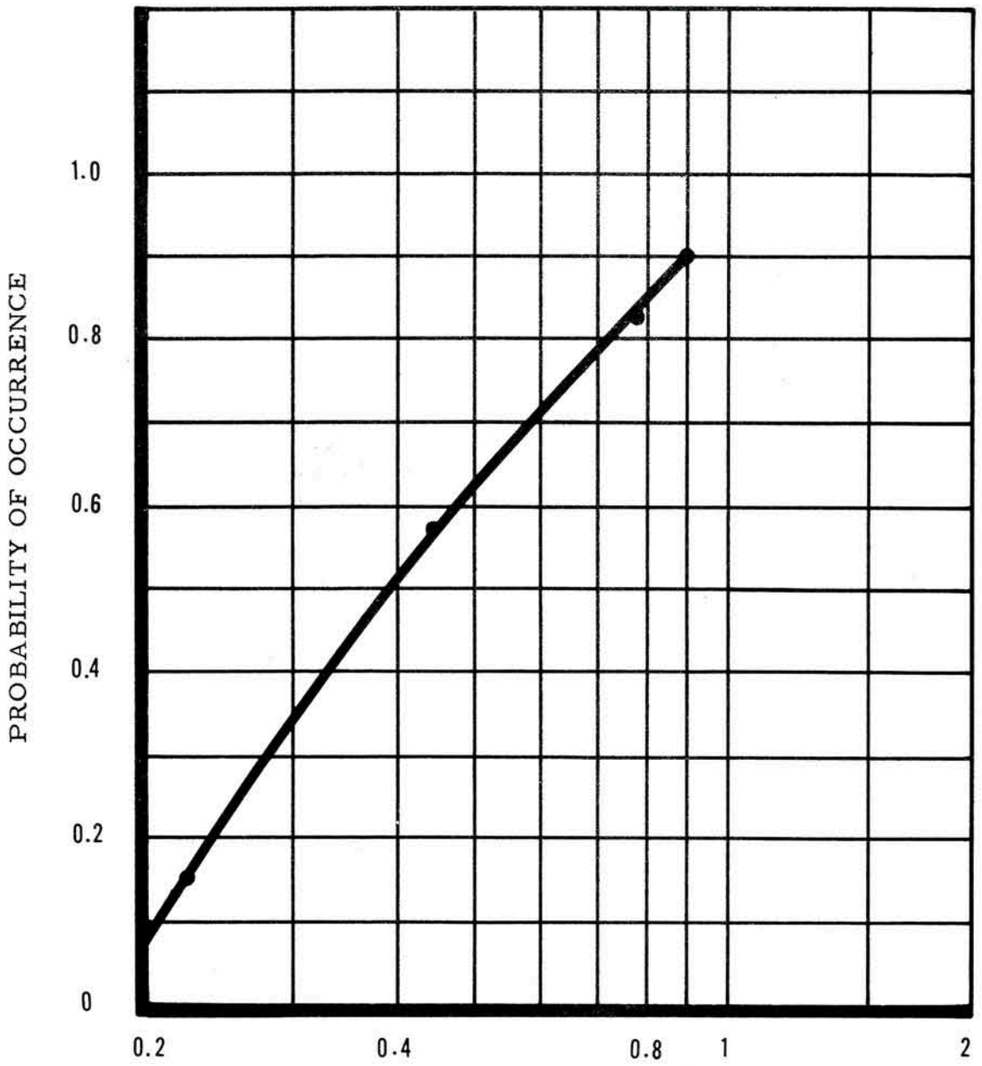
* The coordinates refer to the location of vault no. 6 which houses the 3-component groups of short-period and intermediate band seismometers from which arrival times are determined.



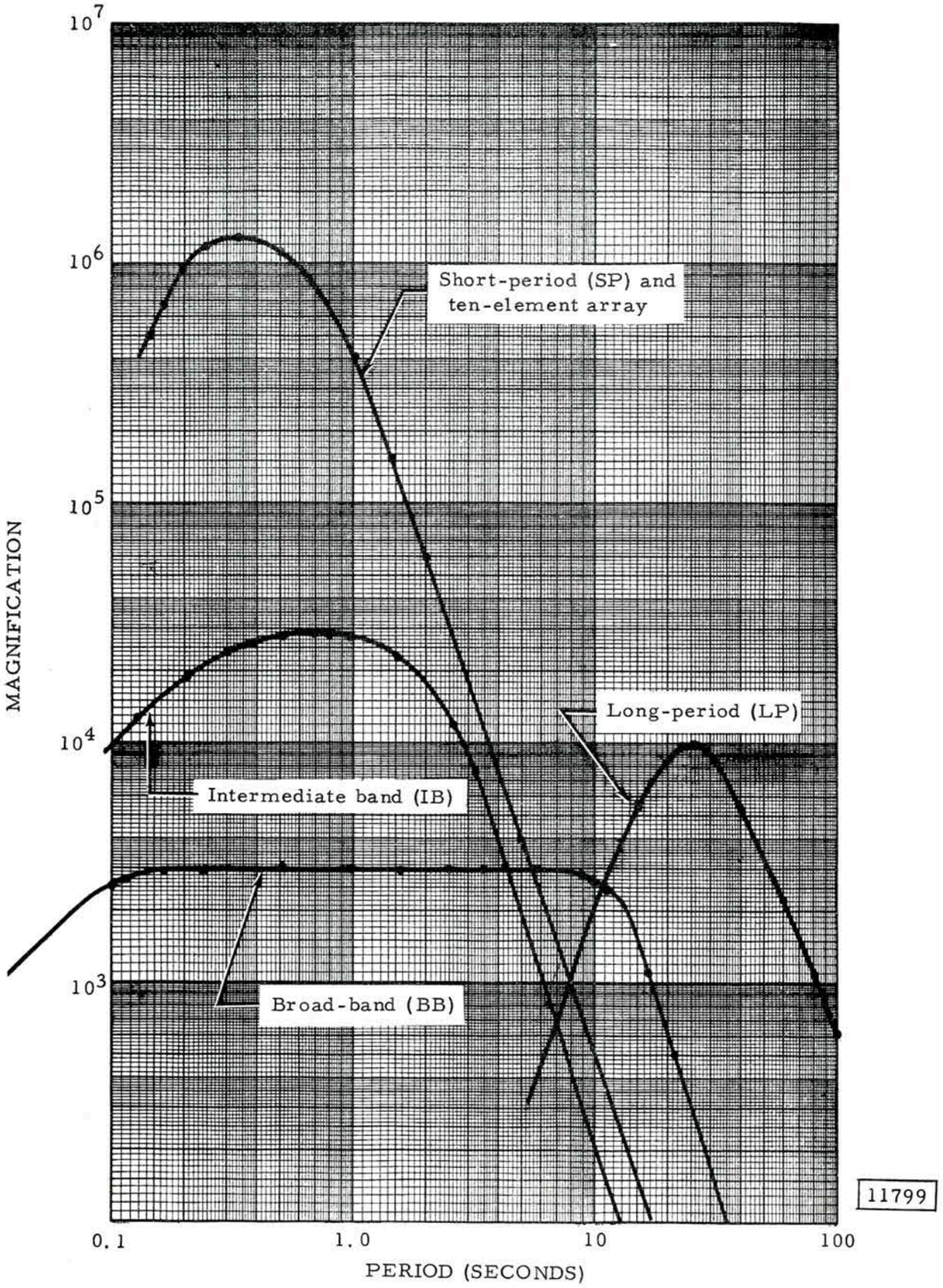
Probability of predominant 0.5-sec microseisms occurring at or less than a given amplitude at Unity magnification

SEISMOGRAPHS

	Ts	λs	Tg	λg	σ^2
SP Vertical Benioff	1.0	1.0	0.2	1.0	0.01
SP Horizontal Benioff	1.0	1.0	0.2	1.0	0.01
IB Vertical Melton	2.5	0.65	0.64	1.5	0.002
IB Horizontal Sprengnether	2.5	0.65	0.64	1.5	0.0005
BB Vertical Press-Ewing	12.5	0.4	0.64	9.0	0.0002
BB Horizontal Sprengnether	12.5	0.4	0.64	9.0	0.0004
LP Vertical Sprengnether	25.0	1.0	30	1.0	0.004
LP Horizontal Sprengnether	25.0	1.0	30	1.0	0.004

SP = Short Period
IB = Intermediate Band
BB = Broad Band
LP = Long Period
Ts = Free Period of seismometer in secs.
λs = Damping constant of seismometer
Tg = Free Period of galvanometer in secs.
λg = Damping constant of galvanometer
σ^2 = Coupling Coefficient

NOTE: Response curves may be found on page 4.



Response characteristics of seismographs

INTERPRETATION OF SYMBOLS

1. Earthquakes Listed

All local (L), near-regional (NR), regional (R), and distant earthquakes (T) are tabulated on the following pages.

2. System

In the column headed "Syst." (system), the seismograph (SP, IB, BB, or LP) and component (Z, N, or E) used to measure arrival time are designated. When no component designation appears, the phase is read from the vertical component. When neither system nor component designation appears, the phase is read from the SP vertical component.

3. Phase

(1) "i" (impetus) preceding a phase designates sudden beginning of the motion. (A designation of "i" in the case of initial P motion indicates a signal-to-noise ratio exceeding about 5/1).
(2) "e" (emersio) designates gradual beginning.
(3) "i" or "e" alone designates an unidentified phase.
(4) ( ) (parenthesis marks) indicate uncertainty.

4. Time

(1) Date and arrival time are given in Greenwich Civil Time (G. C. T.)
(2) The arrival time is reported as the earliest time on Z, N, or E. Single Z rather than the array summation ($\sum$) is used for measuring arrival times on the SP seismographs.

5. Ground Motion

(1) In the columns headed "A" and "T" are tabulated earth displacement in millimicrons and period in seconds, respectively. An amplitude of 999 indicates that a signal cannot be measured reliably. A "c" or "d" in the "A" column indicates compression or dilation, respectively, of the ground as indicated by the vertical component instrument.

The value of "A" for P phases is the maximum amplitude in the first ten seconds. All amplitudes are center-to-peak amplitudes.

(2) Trace amplitudes are measured to the nearest 1/2 millimeter at X10 view.

6. Direction

In the column headed "Dir." (direction), the direction of the epicenter as viewed from WMSO is indicated. For teleseisms, direction is obtained only from P and Rayleigh waves and is listed opposite the phase from which it is obtained. For close events, direction may be obtained from P-wave step-out shown on the individual short-period vertical traces.

7. Type

Earthquakes are identified as either:

L	(local) - - - - - - - - - - -	0°	- 1.4°
NR	(near-regional) - - - - - -	1.4°	- 6°
R	(regional) - - - - - - -	6°	- 16°
T	(teleseismic) - - - - - - -	16°	- 180°

8. Remarks Column

(1) Epicentral locations, time of origins, depth of foci, and magnitudes are obtained from the U.S. Coast and Geodetic Survey Preliminary Determination of Epicenters cards.

(2) The nature of the surface waves is indicated subjectively.

(3) Epicentral locations and distances reported by the station are accompanied by an indication of the phases used to determine epicentral distance, e.g. △ (S-P) = 6°, Central Colorado.

(4) Operational notes refer to operational difficulties that affect analysis of data.

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
01 Dec		eP	07	45	19.4	13	1.4		T	Kamchatka
		e		46	08.5		1.0			56.6 N 158.8 E
	LPN	eS		54	21		19.0			h about 18 km
	LP	e(Sur)	08	01	30					0 = 07 34 17.9
	LPN	eSur		06	22					Strong surface waves
		eP'P'		13	33.9		1.1			on LP.
	LP	eSur		14	43					
01 Dec		eP'	08	17	42.0	2	0.8		T	Off coast of Negros,
		ePKKP		27	37.7		0.6			Philippine Islands
										8.7 N 122.0 E
										h about 36 km
										0 = 07 58 49.7
01 Dec		eP	09	09	54.4	1	0.8		T	
		e		10	37.1		0.8			
01 Dec		eP'	09	35	02.5	1	0.6		T	Banda Sea
										6.0 S 130.8 E
										h about 85 km
										0 = 09 16 06.9
01 Dec		eP	09	48	03.4	1	0.6		T	
01 Dec		eP	11	46	28.4	4	1.1		T	
		e		48	38.9		1.3			
01 Dec		eP	12	11	37.8	1	0.5		T	
01 Dec		eP	17	02	48.0	2	0.8		T	
01 Dec		eP	17	54	58.3	2	0.9		T	
01 Dec		eP	20	31	17.5	1	0.6		T	Volcano Islands, region
										27.7 N 141.5 E
										h about 25 km
										0 = 20 17 41.5

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
01 Dec		eP	21	26	56.6	2	0.9		T	East China Sea
	LP	e		27	05		17.0			26.5 N 124.9 E
	LP	e		28	06		19.0			h about 206 km
		e			27.0		0.9			0 = 21 13 04.1
		e			51.0		1.0			Medium surface waves
		e		30	07.0		1.5			on LP
		e		31	06.6		0.9			
		ePP			21.2		1.5			
		e		32	14.3		1.7			
	LP	e			30		16.0			
		e			36.9		2.0			
		e		33	01.0		1.8			
		e		35	52.0		1.1			
		e		36	19.4		1.0			
		e		37	07.1		1.1			
	LPE	eSKS			18		18.0			
	LPE	eSKS			52		15.0			
	LPE	eS		38	39		17.0			
	LP	eSP		40	13		18.0			
	LPE	ePPS		41	40		20.0			
		$ePKKP_1$		42	25.2		0.5			
		$ePKKP_2$			41.6		0.7			
		e		43	35.8		1.0			
		e		44	25.0		1.0			
	LPE	eSS		45	57		25.0			
	LPE	eSSS		50	00		30.0			
	LPN	e(PKPSKS)		57	50		30.0			
	LPN	eSur	22	05	20					
01 Dec		eP	21	27	37.8	2	0.4		NR	$\triangle$(S-P) = 1.4°
	E	eS			56.5		0.4			
01 Dec		eP	23	45	38.3	3	1.0		T	
02 Dec		eP	00	26	58.1	2	0.4	NE	NR	$\triangle$(S-P) = 2.7°
	E	eS		27	30.3		0.5			

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
02 Dec		eP	00	57	05.8	1	0.3	(SW)	L	$\triangle$(S-P) = 0.1°
	N	eS			09.3		0.4			
02 Dec		eP	04	52	17.9	2	0.7		T	
02 Dec		iP	04	52	40.6 d	34	0.9	SE	T	
02 Dec		eP	05	11	22.2	5	1.3		T	Weak surface waves, Love
	LPN	eSur		28	35					and Rayleigh type, on LP.
	LP	eSur		31	00			NE		
02 Dec		eP	07	24	14.4	19	1.0	SSW	T	Strong surface waves
	LPE	eS		27	41		19.0			on LP
	LPE	eSur		28	58					$\triangle$(S-P) = 19°
02 Dec		eP	08	06	57.6	2	0.5		R	
		e		08	08.6		0.8			
	E	eSur		10	33.0		0.8			
02 Dec		eP	12	52	33.8	31	1.0		T	Northern Tunisia
		ePP		55	41.4		1.2			36.5 N 8.6 E
	LPN	e(SKS)	13	03	00		20.0			h about 62 km
	LPN	eSS		08	00		30.0			0 = 12 40 17.8
	LPE	e		14	06		16.0			Strong surface waves,
	LPE	eSur		16	00					Rayleigh type, at
	LP	eSur		20	56					13 20 56 on LP.
02 Dec		eP	13	27	40.9	5	1.0		T	
02 Dec		eP	14	39	03.0	5	1.2		T	
02 Dec	LP	eSur	14	52	00				T	Weak surface waves on LP. Possible phase of previous event.
02 Dec		eP	16	14	46.3	2	0.6		T	
02 Dec		eP	17	48	05.8	5	1.0		T	

DATE	Syst.	Phase	Arrival Time G.C.T.			Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h.	m.	s.					
02 Dec		eP	18	02	24.6	2	0.4	SE	NR	Quarry blast near
		e			34.6		0.5			Chico, Texas
	E	e			43.2		0.4			$\triangle$(S-P) = 1.7°
	E	eS			46.3	999				
02 Dec		eP	18	14	06.5	3	1.0		T	
02 Dec		eP	18	58	56.4	3	0.7		T	Tonga Islands
	LPE	eS	19	10	06		18.0			22.7 S 175.1 W
	LP	eSur		30	45					h about 89 km
										0 = 18 45 51.6
										Weak surface, Rayleigh type, on LP.
02 Dec		eP	19	29	52.6	3	0.8		T	Andreanof Islands, Aleutian Islands
										51.8 N 179.6 E
										h about 81 km
										0 = 19 19 58.5
02 Dec		eP	22	28	01.1	3	0.3	SE	NR	Quarry blast near
		e			10.9		0.3			Chico, Texas
		eS			22.7	999				$\triangle$(S-P) = 1.7°
03 Dec		eP	01	04	34.2	32	1.1		T	Guerrero, Mexico
	LP	eS		08	00		17.0			17.9 N 99.3 W
	E	eSur		09	13.8		3.0			h about 31 km
	LPN	eSur			30					0 = 01 00 35.2
	E	eSur		10	09.0		2.6			Strong surface waves
	LP	eSur		11	03					on all systems.
	LP	e		27	38		17.0			
03 Dec		eP	04	05	16.7	3	0.8		T	Possible new event at
		e		08	24.2		1.0			04 08 24.2
03 Dec		eP	05	55	15.5	1	0.7		T	

DATE	Syst.	Phase	Arrival Time G.C.T.			Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h.	m.	s.					
03 Dec		eP	07	52	54.7	4	0.9		T	Possible new event
		e		53	57.9		0.6			at 07 53 57.9
		e		54	06.2		0.9			
03 Dec		eP'	08	59	04.0	10	1.5		T	Off coast of Formosa
		$ePKKP_1$	09	09	51.0		0.8			25.0 N 122.9 E
		$ePKKP_2$		10	03.9		0.9			h about 91 km
										0 = 08 40 20.6
03 Dec		eP	11	21	05.7	2	0.4		R	Strong surface waves
		e			15.1		0.7			on SP.
		eSur		23	33.9	999				Weak surface on IB
	E	e		26	01.4		1.5			and LP.
	LP	eSur		27	30					
03 Dec		eP'	12	27	48.9	2	0.8		T	Java Sea
										5.7 S 113.8 E
										h about 633 km
										0 = 12 09 18.7
03 Dec		eP	14	38	03.2	2	0.6		T	Northern Chile
		ePcP			34.1		0.6			24.0 S 68.1 W
										h about 217 km
										0 = 14 27 43.4
03 Dec		eP	16	28	12.9	1	0.6		T	Santa Cruz Islands
		ePP		32	05.6		1.5			11.6 S 166.1 E
	LPN	eSKS		38	54		22.0			h about 122 km
	LPN	ePS		41	20		18.0			0 = 16 14 31.4
	LPN	ePPS		42	30		20.0			Strong surface waves,
		$ePKKP_1$		44	24.4		0.6			Rayleigh type, on LP.
		$ePKKP_2$			40.0		1.0			Weak surface on BB.
		$ePKKP_3$			49.4		0.8			
	LPN	eSS		46	50		30.0			
	LP	eSKKP		48	20		22.0			
	LPN	eSSS		50	40		36.0			
	LP	eSKKS		51	50		38.0			
	LP	e		53	20		28.0			
	LPN	e		54	00		28.0			
	LPN	e		57	00		35.0			
	LP	eSur	17	00	28					

DATE	Syst.	Phase	Arrival Time G.C.T.			Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h.	m.	s.					
03 Dec		eP	18	45	27.0	5	1.0		T	Armenia S.S.R.
		ePP		48	34.6		1.2			Turkey border region
	LPE	eSur	19	16	55					41.2 N 44.0 E
	LP	eSur		26	10					h about 49 km
										0 = 18 31 59.1
										Medium surface waves
										Rayleigh type, on LP
										at 19 26 10.
03 Dec		eP	19	09	09.2	1	0.3	SE	NR	Quarry blast probably near
	E	eS			27.9		0.4			Chico, Texas
										$\triangle$(S-P) = 1.4°
03 Dec		eP	19	24	28.6	3	1.0		T	
03 Dec		eP	20	07	14.5	48	1.0		T	Near Vladivostok, U.S.S.R.
		ePP		10	44.0		1.9			43.6 N 134.9 E
	E	eSKS		17	03.4		1.0			h about 420 km
	E	eS			24.0		1.5			0 = 19 55 05.3
	LPN	ePPS		20	02		24.0			
	LPN	eSS		23	30		28.0			
	LPN	e		30	14		32.0			
03 Dec		eP	21	30	36.3	3	0.9		T	$\triangle$(S-P) = 68°
	LPN	eS		39	34		23.0			
03 Dec		eP	21	40	53.0	2	0.8		T	
03 Dec		eP	23	08	28.8	3	1.0		R	
		e		09	13.3		1.0			
		e			29.1		1.0			
	N	eSur		12	35.0		2.0			
03 Dec		eP	23	31	20.4	1	1.0		R	
		e			31.7		1.0			
		e			39.2		1.0			
	N	eSur		34	47.5		2.0			

DATE	Syst.	Phase	Arrival Time G.C.T.			Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h.	m.	s.					
04 Dec		eP	03	50	58.7	1	0.8		T	Off south coast of Alaska Peninsula
										55.2 N 159.9 W
										h about 106 km
										0 = 03 42 38.2
04 Dec		eP	05	22	03.4	2	1.0		T	
04 Dec	LPE	eSur	06	22	49				T	New Britain
	LP	eSur		25	45					5.2 S 151.6 E
										h about 59 km
										0 = 05 33 18 5
										Medium surface waves,
										Rayleigh type, at 06 25 45
										on LP.
04 Dec		eP	07	42	26.5	3	0.6		T	South of Dominican Republic
		epP			56.0		0.8			18.9 N 68.8 W
		e		43	03.0		0.9			h about 164 km
		e			12.7		0.8			0 = 07 36 26.0
04 Dec		eP	08	30	58.6	6	0.8		T	Off northwest coast of
		e		31	19.4		0.8			Kamchatka
		e			31.2		1.1			60.3 N 160.4 E
	LPN	eSur		54	00					h about 15 km
	LPN	eSur		56	00					0 = 08 20 14.0
	LP	eSur		59	00					Medium surface waves,
										Rayleigh type, at 08 59 00
										on LP.
04 Dec		eP	10	31	12.3	2	0.8		T	
04 Dec		eP	11	24	26.0	2	1.0		T	
04 Dec		eP	12	40	39.9	1	0.5		T	
04 Dec		eP	12	53	48.6	5	1.3		T	Possibly P diffracted
										from following event

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
04 Dec		eP'	12	56	25.1	3	1.2		T	Tibet
		ePP		57	22.1		1.4			33.2 N 95.3 E
		e	13	06	35.4		1.0			h about 45 km
		$ePKKP_1$		07	44.7		1.0			0 = 12 38 11.9
		$ePKKP_2$			53.0		0.8			Strong surface waves,
		$ePKKP_3$			57.4		0.8			Love and Rayleigh type,
	LPN	eSS		13	06		16.0			on LP.
	LPE	eSKKS		14	25		20.0			Medium Rayleigh type on BB.
	LPN	e		20	48		20.0			
	LPN	e		22	18		24.0			
	LPE	e		23	20		20.0			
	LPN	e		24	10		32.0			
	LPN	eSur		25	50					
	LP	eSur		33	00					
04 Dec		eP	13	11	37.6	2	0.9		T	
04 Dec		eP	14	39	37.6	1	0.7		T	
04 Dec		eP	14	40	31.2	2	0.6		T	Possible PcP of preceding event
04 Dec		eP	16	19	32.2	2	1.0		T	Off west coast of Colombia
		e			45.1		0.8			0.6 N 78.3 W
										h about 25 km
										0 = 16 12 08.8
04 Dec		eP	21	18	43.6	1	0.4	SE	NR	Quarry blast near
	E	eS		19	05.0		0.4			Chico, Texas
										$\triangle$(S-P) = 1.7°
04 Dec		eP	22	33	02.4	1	0.8		T	
04 Dec		eP	22	59	44.2	2	1.0		T	
04 Dec		eP	23	13	19.0	1	0.5		NR	Probable blast in
	E	eS			49.8		0.5			Keystone Dam area, Okla.
										$\triangle$(S-P) = 2.5°

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
05 Dec		eP	01	28	35.5	2	1.0		T	
05 Dec		eP	04	58	40.3	2	1.0		T	
05 Dec		eP	06	56	38.5	25	1.1		T	Southern Chile
										45.9 S 74.6 W
										h about 25 km
										0 = 06 44 12.7
05 Dec		eP	08	48	58.8	1	0.4	E	L	$\triangle$(S-P) = 0.9°
	N	eS		49	11.7		0.5			
	E	e			18.6		0.5			
05 Dec		eP	11	00	26.8	2	0.7		T	
		e			38.5		0.6			
		e			44.8		1.0			
05 Dec		eP	12	59	04.4	9	1.5		T	
05 Dec		eP	13	16	07.8	1	0.7		T	New Hebrides Islands
										16.0 S 168.1 E
										h about 145 km
										0 = 13 02 31.9
05 Dec		eP'	13	20	15.0	352	3.0		T	Southwest of Tasmania
	E	ePKS		23	59.5		1.5			50.8 S 139.8 E
	LPE	eSKS		27	28		25.0			h about 64 km
	LPN	e		28	50		24.0			0 = 13 01 04.7
	LPN	e		31	20		26.0			Strong surface waves,
		ePcsPKP		32	19.7		1.0			Love and Rayleigh type, on LP.
		e			39.3		1.0			Medium Rayleigh type on BB.
	LPN	e			53		25.0			
		e		33	28.7		1.0			
	LPN	e		34	41		20.0			
		e		35	34.0		1.0			
	LPN	e		36	00		23.0			
	LPN	e		38	35		28.0			
	LPN	e(SKKKS)		39	50		25.0			
	LPE	eSS		41	05		30.0			

(continued on next page)

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
	LPN	e(SKSSKS)		44	00		29.0			(continued from preceding page)
	LPE	e		49	00		42.0			
	LPE	eSur		56	30					
	LP	eSur	14	04	00					
05 Dec		eP	15	27	30.3	5	1.0		T	
		e			42.8		0.9			
05 Dec		eP	16	38	15.1	1	0.3		NR	Quarry blast near Chico, Texas
		e			24.0		0.4			
	E	e			27.2		0.4			△(S-P) = 1.6°
	E	eS			35.7		0.4			
05 Dec		eP	17	08	41.6	2	0.9		T	
05 Dec		eP	17	32	21.0	1	0.7		T	
		e			44.4		0.7			
05 Dec		eP	18	45	53.5	1	0.5		NR	△(Sn-Pn) = 3.2°
		e			57.0		0.5			Surface is Lg.
		e		46	01.4		0.5			△(Lg-P) = 3.2°
	E	eS			31.5		0.4			
	E	e			37.5		0.5			
	E	eSur			43.8		0.5			
05 Dec		eP	21	44	19.2	2	0.3	N	NR	△(S-P) = 1.5°
	E	eS			38.7		0.4			
		e		45	14.5		0.6			
05 Dec		eP	22	41	55.7	3	0.2	ESE	L	△(S-P) = less than 0.1°
		eS			57.7		0.2			
		e			59.0		0.4			
05 Dec		eP	23	16	31.0	6	1.2		T	
05 Dec		eP	23	52	55.4	1	0.5		NR	△(S-P) = 2.7°
	N	eS		53	28.5		0.6			

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
06 Dec		eP	02	28	48.2	1	0.8		T	Off east coast of Honshu, Japan 37.8 N 142.6 E h about 47 km 0 = 02 15 59.5
06 Dec		eP	04	27	47.0	2	0.7		T	
06 Dec		eP	04	57	53.8	2	0.8		T	
06 Dec		eP	06	05	27.6	12	1.6		T	Andaman Islands
		eP'		07	48.8		1.7			13.7 N 93.6 E
		ePP		10	06.5		2.0			h about 53 km
		eSKP		11	12.5		2.0			0 = 05 48 39.3
	LP	ePPP		12	44		14.0			Mag. 5-3/4 - 6 (Pal)
		e(PKKP)		16	46.6		0.9			Initial arrival is
		e		17	02.1		0.6			P diffracted.
		e		20	28.6		1.5			Strong surface waves,
		eSKKP			42.0		1.2			Love and Rayleigh type,
	LPN	eSS		27	32		18.0			on LP.
	LPN	eSur		51	00					
	LP	eSur		54	15					
06 Dec		eP	08	43	05.8	2	1.0		T	
06 Dec		eP	13	48	59.7	29	0.8		T	Tonga Islands region
	LPN	eSKS		59	36		20.0			23.5 S 176.0 W
	LPN	eS	14	00	11		20.0			h about 18 km
	LPN	ePS		01	30		23.0			0 = 13 35 43.8
		ePKKP		06	10.0		0.8			Mag. 6-1/4 (Berk).
	LPN	eSS			11		25.0			Strong surface waves,
	LPN	eSSS		10	20		30.0			Love and Rayleigh type,
	LP	e		11	30		37.0			on LP.
	LPE	eSur		12	44					Medium Rayleigh type waves
	LP	eSKKKS		17	00		54.0			on BB.
	LP	eSur		19	30					
06 Dec		eP	13	55	51.2	4	0.8		T	

DATE	Syst.	Phase	Arrival Time G.C.T.			Ground Motion A	T	Dir.	Type	Remarks
1961			h.	m.	s.					
06 Dec		eP	15	31	22.5	6	0.8		T	Tonga Islands region 23.7 S 175.7 W h about 29 km 0 = 15 18 05.8
06 Dec		iP	16	51	07.2 c	60	0.9		T	Kurile Islands 49.4 N 155.2 E h about 22 km 0 = 16 39 31.5 Mag. 6-6-1/4 (Pas), 6-1/4 (Berk) Strong surface waves, Love and Rayleigh type, on LP.
		ePcP			22.2		1.0			
		ePP		53	57.5		3.0			
	LPN	eS	17	00	33		24.0			
	N	eScS			59.0		3.4			
	LPE	eSS		04	50		25.0			
	LPN	eSSS		08	20		22.0			
	LPN	eSur		11	15					
	LP	eSur		16	10					
		e(P'P')		18	22.3		1.0			
06 Dec		eP	18	16	48.1	2	0.7	S	T	
06 Dec		eP	19	20	27.8	1	0.3		NR	△(S-P) = 1.5°
	E	eS			46.9		0.3			
06 Dec		eP	22	18	18.1	3	0.8		R	
	E	eSur		22	17.0		0.8			
06 Dec		eP	23	36	37.9	4	0.8		T	
07 Dec		eP	00	05	47.6	3	0.9		T	
07 Dec		eP	00	15	47.8	2	0.6		R	
	E	eSur		19	36.7		1.0			
07 Dec		eP	00	31	39.7	12	1.1		T	Tonga Islands region 23.4 S 175.9 W h about 45 km 0 = 00 18 26.0 Medium surface waves Love and Rayleigh type, on LP.
		e			46.0		0.8			
		e			51.9		0.9			
		e			54.2		1.0			
		e		32	47.9		0.8			
	LPN	eSKS		42	15		14.0			
	LPN	eS			50		18.0			
	LPE	eSur		57	00					
	LPN	eSur	01	02	46					

DATE	Syst.	Phase	Arrival Time G.C.T.			Ground Motion A	T	Dir.	Type	Remarks
1961			h.	m.	s.					
07 Dec		eP	04	31	55.2	6	0.7	SSE	T	
07 Dec		eP	04	56	56.0	34	0.7	SSE	T	
07 Dec		eP	06	03	27.8	4	0.8		T	
07 Dec		eP	07	04	03.2	2	0.7	SSE	T	
07 Dec		eP	07	07	40.3	2	0.8		T	
07 Dec		eP	07	12	29.4	3	1.0		T	
07 Dec		eP	08	07	20.4	2	0.8		T	
07 Dec		eP	13	13	50.2	2	0.7		T	
07 Dec		eP	14	37	14.4	2	0.6		T	Tonga Islands 22.9 S 175.9 W h about 27 km 0 = 14 24 00.6
07 Dec		eP	16	42	27.6	2	0.8		T	Tonga Islands region 25.4 S 175.4 W h about 79 km 0 = 16 29 13.3
07 Dec		eP	17	41	55.5	1	0.2		L	△(S-P) = less than 0.1° Local artillery
		eS			57.5		0.2			
		e			58.5		0.4			
07 Dec		eP	17	42	11.5	2	0.3	SE	L	△(S-P) = less than 0.1° Local artillery
		eS			13.5		0.3			
		e			14.9		0.4			
07 Dec		eP	17	54	45.5	2	0.3		NR	Quarry blast near Fitzhugh, Oklahoma △(S-P) = 1.5° Surface is Lg △(Lg-P) = 1.6°
		e			46.5	999		ESE		
		e			54.4		0.4			
		e			56.8		0.5			
	N	eS		55	05.2		0.3			
	N	e			07.2	999				
	N	eSur			08.2	999				

DATE	Syst.	Phase	Arrival Time G.C.T.			Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h.	m.	s.					
07 Dec		eP	23	31	54.2	2	0.3	SSE	NR	Quarry blast near
		e		32	04.3		0.4			Chico, Texas
	E	eS			15.8		0.4			Δ(S-P) = 1.7°
	E	e			16.9	999				
08 Dec		eP	03	59	38.5	8	0.9		T	Tonga Islands region
		e	04	00	11.7		1.0			23.6 S 175.8 W
										h about 45 km
										0 = 03 46 24.5
08 Dec		ePP	06	27	44.0		1.3		T	NW New Guinea
		e			52.5		1.2			3.0 S 136.9 E
		e		28	06.5		1.5			h about 64 km
		ePKKP		36	35.0		0.7			0 = 06 07 38.6
	LPE	e		55	30		27.0			Weak surface waves,
	LP	eSur	07	04	00					Rayleigh type, on LP
08 Dec		eP	06	41	27.9	2	0.8		T	Possible ScSPKP of
		e			36.0		0.6			previous New Guinea
		e			43.5		0.6			event
08 Dec		eP	08	02	24.3	57	1.3		T	South of Guadalajaro,
	LP	eSur		07	40					Mexico
										16.3 N 104.3 W
										h about 65 km
										0 = 07 58 02.0
										Medium surface on LP.
08 Dec		eP	08	32	06.2	2	1.0		T	
08 Dec		eP'	09	55	07.6	4	1.0		T	Near north coast of
		ePP		56	17.0		1.1			New Guinea
		ePKKP	10	05	34.0		0.9			1.8 S 139.4 E
	LP	eSur	10	31	30					h about 55 km
										0 = 09 36 24.9
										Medium surface, Rayleigh
										type, on LP.

DATE	Syst.	Phase	Arrival Time G.C.T.			Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h.	m.	s.					
08 Dec		eP'	10	59	36.7	1	0.8		T	Gulf of Aden
		e			44.4		0.6			11.4 N 49.7 E
										h about 25 km
										0 = 10 40 23.2
08 Dec		eP	13	59	21.4	2	1.1		T	
08 Dec		eP	14	56	00.9	6	0.8	W	T	
08 Dec		eP	15	19	50.7	2	1.0		T	
08 Dec		eP	15	33	12.5	2	0.7		T	
		e			34.6		1.0			
08 Dec		eP	15	51	18.7	1	0.6		T	
08 Dec		eP	18	47	34.5	11	1.2	SE	T	
		e		48	45.6		1.2			
08 Dec		eP	20	12	36.6	1	0.8		T	
08 Dec		eP	21	36	45.6	2	0.5	E	NR	Δ(S-P) = 2.7°
	E	eS		37	18.0		0.5			Surface at 21 37 29.2 is Lg.
	E	eSur			29.2		0.4			Δ(Lg-P) = 2.9°
		eSur			31.4		0.5			
08 Dec		eP	22	04	55.8	2	0.8		T	
09 Dec		eP	00	39	35.1	3	0.8		T	
09 Dec		eP	02	23	19.6	27	1.1		T	Kodiak Island,
		epP			27.6		0.9			Alaska region
	LPE	e		25	12		18.0			56.3 N 153.9 W
		ePcP			16.8		0.9			h about 31 km
		eScP		29	02.6		1.5			0 = 02 15 22.0
	LP	e(ScP)			22		15.0			Mag. 5-1/2 - 5-3/4 (Berk),
	E	e			32.2		3.5			5-1/2 (Pal).
	LPN	eS			49		20.0			Strong surface waves,
	LPN	e(SS)		33	10		20.0			Love and Rayleigh, on LP.
	LPN	eSur		35	25					Strong Rayleigh on BB.
	LP	eSur		37	35					

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
09 Dec		eP	02	32	20.5	5	1.1		T	
09 Dec		eP	04	08	17.8	33	1.1		T	Off coast of Peru
	LPN	eS		15	54		24.0			14.9 S 75.7 W
	N	ePS		16	00.2		4.5			h about 39 km
	LPE	e		17	04		19.0			0 = 03 58 55.4
	LPE	e			29		15.0			Strong surface waves,
	LPE	e			53		18.0			Love and Rayleigh type,
	LPE	eScS		18	03.2		3.0			on LP.
	LPE	e		20	20		24.0			
	LPE	eSur		22	25					
	LP	eSur		24	25					
09 Dec		eP	04	45	39.1	2	1.0		T	
09 Dec		eP	04	58	24.0	2	0.9		T	
09 Dec		eP	06	21	07.3	1	0.4		R	
		e			11.4		0.5	NE		
		e			20.7		0.5			
		e			34.7		0.5			
	E	e			35.1		0.6			
		e			50.5		0.5			
	E	e(Sur)		24	07.9		0.8			
09 Dec		eP	06	26	11.3	2	0.7	S	T	
09 Dec		eP	08	14	44.2	1	0.5		T	
09 Dec		eP	09	56	01.4	4	1.2		T	
09 Dec		eP	10	37	30.9	8	0.8		T	
09 Dec		eP	11	14	07.6	6	0.8	SW	T	
		e			12.1		0.8			
		e			19.0		1.0			
		e			22.2		1.0			
09 Dec		eP	11	19	51.7	1	0.6		T	

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
09 Dec		eP	11	30	19.0	1,263	2.3		T	Near coast of southern
	LP	ePP		33	21		15.0			Chile
	LPN	eSKS		40	21		24.0			43.7 S 75.2 W
	N	ePS			32.2		6.0			h about 34 km
		e		44	08.4		1.0			0 = 11 18 08.9
	LPE	eSS		45	11		26.0			Mag. 6-3/4 (Pas),
		ePKKP		48	40.7		1.0			6-1/2 (Berk),
		e(PKKP)			57.2		0.7			5-3/4-6 (Pal.).
		e(PKKP)		49	13.2		0.8			Possible new event at
	LPN	eSSS			18		30.0			11 44 08.4
	LPE	eSur		52	21					Strong surface waves, Love
	LP	eSur		57	01					and Rayleigh type, on LP.
		eP'P'			14.1		1.2			
		e(P'P')			24.6		1.4			
		e(P'P'P')	12	17	05.3		1.5			
09 Dec		eP	11	46	18.8	3	1.0		T	
09 Dec		eP	11	50	06.4	7	1.3		T	
09 Dec		eP	12	37	34.8	2	1.0		T	
09 Dec		eP	14	30	21.2	2	0.5		T	
09 Dec		eP	14	52	16.1	3	0.2	SE	L	Local artillery. Acoustic
		eS			17.3		0.3			waves are present.
		e			18.7	999				$\triangle$(S-P) = less than 0.1°
09 Dec		eP'	16	55	32.0	2	0.7		T	South of Java
		epP'			39.3		0.9			8.9 S 105.6 E
		e			54.0		1.0			h about 35 km
		e		56	12.7		1.0			0 = 16 35 53.2
09 Dec		eP	20	02	05.8	19	0.9		T	Fiji Islands
		e			14.7		0.6			21.7 S 179.9 E
		epP		04	18.0		0.9			h about 620 km
		e		05	05.2		1.5			0 = 19 49 41.3
		e			21.6		1.3			
		e			40.0		1.2			

(continued on next page)

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
		ePP		06	05.4		1.2			(continued from preceding page)
	LPN	ePS		15	25		23.0			
	LPN	e		16	30		15.0			
	LPN	e		17	37		17.0			
	LPE	eSS		19	00		18.0			
	LPE	eSSS		22	30		28.0			
	LPN	e		26	39		24.0			
09 Dec		eP	20	06	44.6	2	0.7		T	
09 Dec		eP	20	07	55.6	6	1.2		T	
		e		10	42.9		1.3			
09 Dec		eP	20	18	34.6	1	0.7		T	
		e			55.9		0.6			
09 Dec		eP	20	21	40.5	1	0.7		T	
09 Dec		eP	20	41	36.4	2	0.9		T	
		e			48.0		0.7			
09 Dec		eP	21	17	06.0	3	1.0		T	
09 Dec		eP	21	29	52.7	13	1.3		T	Kodiak Island region
		e		30	17.7		1.0			56.3 N 153.5 W
	LPN	eSur		43	36					h about 19 km
										0 = 21 21 49.0
										Weak surface waves on LP
09 Dec		eP	21	54	45.9	2	0.7		T	
		e			52.8		0.7			
09 Dec		eP	21	54	58.6	5	0.8		T	Tonga Islands region
		e		55	03.5		0.7			23.0 S 176.8 W
										h about 25 km
										0 = 21 41 42.1
09 Dec		eP	23	20	55.0	2	0.6	SSE	R	
	E	eSur		24	03.4		0.6			

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
09 Dec		eP	23	27	27.4	1	0.7		T	
10 Dec		eP	00	02	01.4	1	0.6		R	Strong surface waves
		e			35.4		1.0			on LP, SP and IB.
	N	eSur		05	53.5		1.6			
10 Dec		eP	05	06	30.2	3	0.8		T	Kodiak Island region
		e			37.7		0.8			56.5 N 152.1 W
										h about 68 km
										0 = 04 58 41.3
10 Dec		eP	06	55	25.0	3	1.0		T	
10 Dec		eP	08	40	27.3	6	0.7	SE	T	
		e			42.4		0.6			
10 Dec		eP	08	52	20.3	2	0.8		T	Aegean Sea
		e			45.3		1.0			38.8 N 25.7 E
		e		53	06.3		0.9			h about 79 km
										0 = 08 39 11.1
10 Dec		eP	09	59	34.0	2	0.7		T	
10 Dec		eP	11	06	29.7	2	0.7		T	
10 Dec		eP	11	37	44.5	3	1.0		T	
10 Dec		eP	12	29	29.4	3	0.8		T	
10 Dec		eP	12	45	21.9	3	1.0		T	
10 Dec		eP	14	22	08.0	3	0.9		T	
10 Dec		eP	17	03	37.5	2	0.8		T	Tonga Islands region
										16.3 S 172.6 W
										h about 35 km
										0 = 16 50 54.1

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
10 Dec		iP	19	01	16.8 c	999		WSW	NR	New Mexico
		e			26.8	999				32.26 N 103.86 W
	IB	eS		02	34	999				0 = 19 00 00.0
										(GNOME test)
10 Dec		eP	19	54	40.7	3	1.0		T	
10 Dec		eP	23	59	21.1	4	1.0		T	
11 Dec		eP	00	44	42.0	3	1.0		T	
11 Dec		eP	00	53	16.2	2	0.8		T	
11 Dec		eP	04	51	30.4	14	1.3		R	
		e			39.6		0.9			
	E	eSur		55	56.7		1.6			
11 Dec		eP	07	13	00.3	3	0.7		T	
11 Dec		eP	07	43	19.1	2	0.7		T	
11 Dec		eP	08	02	54.3	1	0.7		T	
11 Dec		eP	10	21	03.4	2	0.8		T	
11 Dec		eP	15	18	32.6	9	1.4		T	Near coast of southern
		e		19	01.5		1.0			Chile
										37.3 S 73.7 W
										h about 74 km
										0 = 15 06 53.0
11 Dec		eP	17	06	09.2	7	0.8		T	Near coast of southern
		e			35.0		0.7			Greece
		e			36.9		1.0			36.5 N 23.5 E
		e			43.5		0.9			h about 25 km
										0 = 16 53 05.3
12 Dec		eP	03	45	06.4	3	0.6	WSW	T	

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
12 Dec		eP	11	26	04.3	3	0.6		T	Windward Islands region
										11.8 N 59.8 W
										h about 36 km
										0 = 11 18 14.8
12 Dec		eP	13	43	11.0	2	0.8		T	
12 Dec		eP	13	43	49.0	2	0.6		T	Possible phase of previous event.
12 Dec		eP	17	36	36.7	3	0.8		T	Northern Mariana Islands region
	LP	eSur	18	09	00					21.7 N 146.0 E
										h about 24 km
										0 = 17 23 04.0
										Strong surface waves, Rayleigh type, on LP.
12 Dec		eP	17	57	47.7	1	0.5	SE	NR	Quarry blast probably
		e			56.7		0.4			near Chico, Texas
	E	eS		58	08.5		0.4			$\triangle$(S-P) = 1.6°
	E	e			11.5		0.5			
12 Dec		eP	18	36	35.9	1	0.6		R	
	N	eSur		40	44.9		1.0			
12 Dec		eP	19	11	13.0	3	0.9		T	
12 Dec		eP	22	18	42.6	36	1.3		T	Revilla Gigedo Islands
		e			58.3		1.1			18.9 N 107.6 W
	LPE	eS		21	45		19.0			h about 33 km
	N	e		22	11.0		3.3			0 = 22 14 36.3
	LPE	e			43		34.0			Strong surface waves
	LP	eSur		23	54					on all systems
	E	e			58.0		2.7			
	E	eSur		24	10.0					
	LP	e		29	30		22.0			

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.		Ground Motion A	T	Dir.	Type	Remarks
1961											
12 Dec		iP	23	18	37.1	c	64	1.2		T	Near east coast of
		epP			53.8			1.1			Hokkaido, Japan
	LPN	eSKS		28	50			16.0			43.5 N 146.2 E
	LPN	eScS		29	20			20.0			h about 44 km
	LPN	eSS		34	15			20.0			0 = 23 06 18.4
	LP	eSur		46	45						Medium surface waves, Rayleigh type, on LP.
12 Dec		eP	23	30	37.6		38	0.6	SE	T	
13 Dec		eP	03	22	17.3		2	0.7		T	
13 Dec		eP	03	29	12.5		2	0.8		T	
13 Dec		eP	05	20	13.5		1	0.6		T	
13 Dec		eP	06	17	43.9		18	1.7		T	
13 Dec		eP	11	36	13.2		9	0.8		T	Southern Chile-Argentina
		e			16.6			0.9			border
		e			41.6			1.0			50.9 S 73.0 W
		e		37	23.4			1.0			h about 82 km
	LP	eSur	12	06	30						0 = 11 23 28.9
											Weak surface waves, Rayleigh type, on LP.
13 Dec		eP	14	16	39.1		4	0.7		T	
		e			46.3			0.7			
		e			54.6			0.6			
		e			56.6			0.6			
		e		17	07.8			0.6			
		e			15.6			0.6			
		e			20.8			0.8			
	E	eSur		20	04.3			0.8			
13 Dec	LP	eSur	17	38	00					T	New Hebrides Islands
											18.9 S 168.4 E
											h about 30 km
											0 = 16 49 50.4
											Medium surface waves, Rayleigh type, on LP.

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
13 Dec		eP	17	48	23.7	1	0.6		T	
13 Dec		eP	17	48	27.3	4	0.8		T	Possible phase of
		e			33.7		0.6			previous event at 17 48 27.3
13 Dec		eP	17	53	31.1	2	0.7		T	
13 Dec		eP	18	01	31.2	4	0.5	NNE	T	
13 Dec		eP	19	30	02.6	3	0.7		T	
		e			21.7		0.6			
		e			54.1		1.0			
14 Dec		eP	00	03	47.7	3	1.1		T	
14 Dec		eP	00	49	25.4	15	0.6	SE	T	
		e			27.5		0.8			
		e		50	03.1		0.9			
		e			21.5		0.8			
14 Dec		eP	01	44	12.1	24	1.4		R	Off south coast of Baja,
		e			20.8		1.0			California
	LPE	eS		47	15		14.0			21.2 N 109.0 W
	LPE	eSur		48	03					h about 60 km
	E	e			05.0		4.0			0 = 01 40 24.7
	E	eSur		49	00.8		3.5			Strong surface waves on all systems. Surface at 01 49 00.8 is Lg.
14 Dec		eP	03	29	40.6	4	1.2		T	
14 Dec		eP	04	07	01.4	3	0.7	SE	T	
		e			10.3		0.7			
14 Dec		eP	05	58	55.5	4	0.8	SE	T	
		e		59	02.7		0.9			
		e			16.5		0.8			

DATE	Syst.	Phase	Arrival Time G.C.T.			Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h.	m.	s.					
14 Dec		eP'	07	29	07.8	3	0.7		T	Near north coast of
		epP'			22.5		1.3			New Guinea.
		ePP		30	17.5		2.0			3.1 S 140.9 E
	LPE	eSKS		36	00		15.0			h about 44 km
	LPE	eSKKS		37	15		20.0			0 = 07 10 23.2
		ePKKP		39	38.0		1.0			Strong surface waves,
	LPE	ePS			56.		22.0			Love and Rayleigh, on LP.
	LPE	ePPS		41	05		22.0			
	LPE	e		44	14		48.0			
	LPE	eSS		46	20		25.0			
	LPN	eSur	08	00	55					
	LP	eSur		05	00					
14 Dec		eP	07	42	07.2	3	1.2		T	
		e			30.0		1.1			
		e		43	03.0		1.1			
14 Dec		eP	08	45	42.0	1	0.5		T	
		e			52.0		1.1			
14 Dec		eP	08	53	45.5	5	1.2		T	
14 Dec		eP	11	26	50.8	2	0.8		T	
14 Dec		eP	12	11	32.0	3	1.0		T	
14 Dec		eP	16	36	39.6	2	0.7		T	
		e		37	14.0		0.6			
14 Dec		eP	18	06	19.2	3	0.9		T	
14 Dec		eP	18	54	25.6	1	0.6		R	
		e			44.0		0.7			
		e(Sur)		57	44.5		0.6			
14 Dec		eP	19	01	24.5	3	1.0		T	Fiji Islands 17.1 S 179.0 W h about 394 km 0 = 18 49 02.4

DATE	Syst.	Phase	Arrival Time G.C.T.			Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h.	m.	s.					
14 Dec		eP	20	26	15.8	1	0.6	NE	NR	△(S-P) = 3.2°
		e			19.3		0.4			Surface is Lg.
		e			22.6		0.5			△(Lg-P) = 3.3°
	E	eS			53.6		0.4			
	E	eSur		27	06.5		0.4			
15 Dec		eP	03	01	54.2	1	0.5	SSE	R	
		e			57.6		0.8			
		e		02	17.7		0.6			
	E	eSur		05	10.5		0.6			
15 Dec		eP	03	32	44.2	4	1.0		T	
15 Dec		eP	04	10	20.4	2	1.0		T	
15 Dec		eP	08	39	04.6	9	1.4		T	
15 Dec		eP	09	15	27.0	5	1.3		T	
15 Dec		eP	09	23	32.3	5	1.3		T	
15 Dec		eP	10	38	27.5	3	1.0		T	
15 Dec		eP	11	06	33.7	2	1.1		T	
		e		07	12.6		1.2			
		e		08	09.5		0.7			
15 Dec		eP	11	44	25.0	2	0.9		T	
		e			53.2		0.6			
15 Dec		eP	11	45	50.0	2	0.6		T	Possible phase of previous event
15 Dec		eP	12	24	04.4	2	0.5	SS(E)	R	
	E	eSur		27	10.0		0.6			
15 Dec		eP	13	51	38.3	2	0.8		T	

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
15 Dec		eP	14	15	06.6	6	0.9		R	
		e			58.5		1.2			
	E	eSur		18	43.4		1.0			
15 Dec		eP	17	58	00.6	5	1.2		T	
15 Dec		eP	18	56	42.4	2	0.9		T	
15 Dec		eP	19	46	17.1	1	0.3		L	△(S-P) = 0.8°
	E	eS			29.1		0.4			
15 Dec		eP'	19	55	04.4	1	0.7		T	Molucca Passage 0.9 N 126.2 E h about 47 km 0 = 19 36 03.5
15 Dec		eP	21	34	14.6	1	0.9		T	
15 Dec		eP	22	16	28.6	2	0.8		T	
15 Dec		eP	23	20	40.6	6	1.4		T	
16 Dec		eP	02	14	56.4	6	1.4		T	
16 Dec		eP	02	57	17.5	5	1.3		T	
16 Dec		eP	04	17	37.6	4	0.8		T	
16 Dec		eP	09	24	30.4	1	0.8		T	
16 Dec		eP	09	30	21.4	2	0.7		T	Kermadec Islands region
		e		31	07.2		0.9			26.3 S 177.5 W h about 61 km 0 = 09 16 57.6
16 Dec		eP	10	12	28.2	8	0.9		T	Tonga Islands region
		e			40.0		1.1			23.9 S 175.4 W
	LPE	eS		23	46		17.0			h about 25 km
	LP	eSur		43	10					0 = 09 59 11.8 Weak surface waves, Rayleigh type, on LP.

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
16 Dec		eP	10	24	36.3	1	0.7		T	
16 Dec		eP	11	24	54.9	1	0.7		T	
		e		25	08.3		0.8			
16 Dec		eP	13	51	31.2	7	1.5		T	Near east coast of Kamchatka
		e(PcP)			48.2		0.8			
		e		52	08.7		1.4			51.9 N 160.2 E
		e		53	20.0		1.7			h about 23 km
	LP	eSur	14	23	00					0 = 13 40 20.1 Weak surface waves, Rayleigh type, on LP.
16 Dec		eP	14	52	12.6	2	0.9		T	
16 Dec		eP	16	32	12.9	1	0.2	NNE	NR	△(S-P) = 1.5°
		e			14.0	999				
		e			23.2	999				
		eS			32.3	999				
16 Dec		eP	17	53	07.0	3	1.0		T	
16 Dec		eP	18	54	05.8	1	0.7		T	
		e			16.4		0.7			
16 Dec		eP	21	05	01.4	2	0.7		T	
16 Dec		eP	21	49	39.2	1	0.4	NE	NR	△(S-P) = 2.6°
	E	eS		50	10.8		0.5			
16 Dec		eP	23	36	18.8	1	0.3		NR	△(S-P) = 1.5°
		e			28.4		0.3			
		eS			37.5	999				
17 Dec		eP	00	56	28.1	101	1.5	SE	R	
		e		58	53.0		1.2			
	E	eSur	01	00	09.5		1.3			
17 Dec		eP	03	36	26.2	1	0.6		T	

DATE	Syst.	Phase	Arrival Time G.C.T.	Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h. m. s.					
17 Dec		eP	05 23 24.8	1	0.7		T	
17 Dec		eP	08 51 02.0	34	2.2		T	
17 Dec		eP	09 51 13.6	4	1.2		T	
17 Dec		eP	16 11 51.1	2	0.7		T	
		e	12 04.4		0.8			
17 Dec		eP	16 39 30.8	3	1.0		T	
17 Dec		eP	21 23 01.0	1	0.6		T	
17 Dec		eP	21 41 16.4	213	1.8		T	Near coast of southern Peru
		e	42.8		1.1			14.4 S 75.8 W
		ePcP	42 23.5		0.9			h about 85 km
		e(PP)	43 20.9		1.3			0 = 21 32 01.8
	E	eS	48 47.0		1.6			Weak surface waves,
	LP	eSur	59 48					Rayleigh type, on LP.
17 Dec		eP	21 42 47.7	21	0.9		T	
17 Dec		eP	21 59 49.6	2	0.7		T	
17 Dec		eP	22 19 02.7	2	0.9		T	
17 Dec		eP'	22 31 44.2	37	1.4		T	South of Tasmania
		e	32 06.0		1.0			54.5 S 143.9 E
		e	38.6		1.2			h about 45 km
	LPN	eSKS	38 48		18.0			0 = 22 12 32.3
		ePcPPKP	39 43.9		1.5			Possible new event at
		e	42 24.1		1.1			22 42 24.1
	LP	eSur	23 14 30					Medium surface waves,
								Rayleigh type, on LP.
18 Dec		eP	03 23 06.6	2	1.0		T	
18 Dec		eP	07 42 48.5	2	1.0		T	

DATE	Syst.	Phase	Arrival Time G.C.T.	Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h. m. s.					
18 Dec		eP	10 47 33.4	1	0.5		T	
		e	40.4		0.6			
		e	44.5		0.6			
18 Dec		eP	15 14 24.0	1	0.3	SE	NR	△(S-P) = 1.8°
	E	eS	46.4		0.5			
18 Dec		eP	15 25 04.2	1	0.3	SE	NR	△(S-P) = 2.2°
		e	30.7		0.4			
	E	eS	31.4		0.4			
	E	e	32.6		0.2			
18 Dec		ePKKP	17 11 22.0		0.6		T	Burma-India border
								26.4 N 96.3 E
								h about 85 km
								0 = 16 42 21.6
18 Dec		eP	18 07 10.7	2	0.3	SE	NR	△(S-P) = 1.7°
		e	20.8		0.3			
	E	eS	32.0		0.4			
	E	e	35.4	999				
18 Dec		eP	20 20 21.1	1	0.7		T	
18 Dec		eP	20 38 11.4	1	0.5		T	
18 Dec		eP	21 48 27.3	2	0.8		T	
18 Dec		eP	22 38 11.0	2	1.0		T	Tonga Islands
								21.3 S 174.2 W
								h about 25 km
								0 = 22 24 49.8
18 Dec		eP	23 49 34.9	2	0.4		NR	Blast probably in
	E	eS	50 02.5		0.4			Keystone Dam area
								△(S-P) = 2.2°
19 Dec		eP	04 58 08.9	2	0.8		T	

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
19 Dec		eP	05	23	40.0	2	0.6		T	
19 Dec		eP	06	42	23.6	2	0.8		T	
19 Dec		eP	13	50	32.3	3	0.9		T	
19 Dec		ePKKP	16	10	06.3		0.7		T	Talaud Islands region 5.0 N 127.2 E h about 33 km 0 = 15 41 15.0
19 Dec		eP	19	46	31.3	2	0.7		T	
19 Dec		eP	20	27	37.2	3	0.8		T	
19 Dec		eP	21	46	19.3	1	0.3		NR	Δ(S-P) = 2.2°
	E	eS			46.2	999				
19 Dec		eP	23	42	08.7	1	0.7		T	
19 Dec		eP	23	43	22.4	2	0.4		NR	Δ(S-P) = 2.7°
	E	eS			55.5		0.6			
20 Dec		eP'	02	03	30.4	2	1.0		T	Near east coast of Borneo 3.0 N 118.4 E h about 17 km 0 = 01 44 19.7
20 Dec		eP	05	08	57.2	5	0.8	ESE	R	
	E	eSur		12	52.8		0.8			
20 Dec		eP	05	48	09.4	3	1.0		T	
		e		49	21.3		0.5			
20 Dec		eP	07	52	23.6	10	0.8	SE	T	
		e			58.7		0.9			
		e		53	10.4		0.6			

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
20 Dec		eP	10	21	09.3	1	0.7		T	
		e			21.1		0.9			
20 Dec		eP	10	41	13.4	2	0.9		T	
20 Dec		eP	13	15	54.2	5	1.0		R	
	E	eSur		19	43.5		0.7			
20 Dec		iP	13	32	25.9 d	999			T	West-central Colombia 4.6 N 75.6 W h about 176 km 0 = 13 25 34.4 Mag. 6-3/4 (Pas), 6 (Pal). Strong surface waves on LP and BB.
		e(pP)		33	10.0	999				
		ePP		34	10.2		1.7			
		e			45.4		1.1			
		eS		37	59.7	999				
		eScP		38	17.9	999				
	BB	eSur		40	40	999				
	E	eScS		42	24.2		2.6			
		e		45	35.0		2.0			
		ePKKP		56	54.2		1.3			
		e(P'P')	14	03	41.2		1.0			
		eP'P'		04	46.6		1.2			
20 Dec		eP	14	14	37.1	22	1.4		T	
20 Dec		eP	16	21	56.0	1	0.8		T	
20 Dec		eP	18	03	52.9	2	0.3	SE	NR	Quarry blast near
		e		04	03.2		0.5			Chico, Texas
		eS			14.7	999				Δ(S-P) = 1.7°
20 Dec		eP	18	14	32.8	5	0.9	SE	T	
20 Dec		eP	18	18	14.4	2	0.4	S	NR	Δ(S-P) = 2.2°
		eS			41.0	999				
20 Dec		eP	21	08	07.3	8	0.8	SSE	R	
		e			23.7		0.7			
		e			59.2		0.7			
		e		10	05.7		0.6			
	E	eSur		11	53.3		0.8			

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
20 Dec		eP	23	05	00.0	1	0.6		T	
20 Dec		eP	23	05	10.6	24	0.9	SE	T	Regional by surface -P interval
		e			36.1		0.6			
	E	eSur		09	09.7		1.0			
20 Dec		eP	23	17	49.2	1	0.2	SSE	NR	△(S-P) = 2.2°
	E	eS		18	15.7		0.4			
	E	e			17.0		0.4			
21 Dec		eP	01	23	50.9	2	0.8		T	
21 Dec		eP	17	26	21.7	3	1.0		T	
21 Dec		eP	18	16	55.0	2	0.4	SSE	NR	△(S-P) = 2.2°
		eS		17	21.9	999				
		e			22.9	999				
21 Dec		eP	22	31	30.5	1	0.6		T	
22 Dec		eP	05	54	23.5	2	1.0		T	
22 Dec		eP	11	31	49.4	21	0.9		T	Off coast of northern California
		e		32	14.4		0.9			40.7 N 126.0 W
										h about 25 km
										0 = 11 26 45.2
										Mag. 4.6 (Berk)
22 Dec		eP	15	06	46.4	10	1.2		T	Kodiak Island, Alaska
										56.2 N 154.3 W
										h about 26 km
										0 = 14 58 33.4
22 Dec		eP	15	41	45.1	269	0.9	SE	T	
		e		42	27.9		1.5			
		e			40.9		1.2			
		e		43	53.0		0.8			

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
22 Dec		eP	19	23	59.4	8	1.2		T	
22 Dec		eP	20	11	19.0	16	1.0	SE	T	
		e			29.0		0.9			
22 Dec		iP	20	27	45.6	c 10	0.2	ESE	L	Local artillery fire with acoustic waves recorded about 30" later
		e			47.2		0.2			△(S-P) = less than 0.1°
		eS			48.0	999				
22 Dec		eP	20	20	08.7	10	1.1		T	
		e			25.5		0.8			
		e			53.3		1.2			
22 Dec		eP	21	46	03.7	2	0.6		T	
22 Dec		eP	22	59	51.8	2	0.8		T	Mariana Islands
		epP	23	00	30.6		0.8			18.6 N 145.6 E
										h about 155 km
										0 = 22 46 24.6
22 Dec		eP	23	07	41.1	3	0.5	E	NR	△(S-P) = 2.9°
	E	eS		08	25.4		0.4			
23 Dec		eP	04	48	28.2	4	0.8		R	
		e			41.5		0.7			
		e			49.8		0.8			
		e		49	06.0		1.5			
	E	eSur		52	21.0		0.8			
23 Dec		eP	06	56	53.2	7	1.2		R	Yellowstone National Park, Montana
		e		58	05.7		1.2			44.9 N 111.2 W
	E	eSur	07	00	56.6		1.2			h about 23 km
										0 = 06 53 36.5
										Surface at 07 00 56.6 is Lg.
23 Dec		eP	09	08	52.4	2	0.7		T	

DATE	Syst.	Phase	Arrival Time G.C.T.	Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h. m. s.					
23 Dec		eP	14 43 14.5	11	0.8		T	Colombia
		e	20.4		0.7			6.4 N 73.4 W
		epP	49.9		1.1			h about 197 km
								0 = 14 36 27.1
23 Dec		eP	17 47 07.2	1	0.6		T	
23 Dec		eP	19 24 40.8	9	1.0		T	Near east coast of Honshu, Japan
								34.9 N 137.6 E
								h about 270 km
								0 = 19 11 54.5
23 Dec		eP	20 08 55.4	1	0.3		NR	△(S-P) = 1.6°
	E	eS	09 16.3		0.3			
23 Dec		eP	20 27 14.6	11	0.8	SE	T	
23 Dec		eP	20 30 28.0	15	0.9	SSE	T	
23 Dec		eP	21 28 07.4	2	0.9		T	Bolivia
		e	47.5		0.5			19.2 S 64.8 W
								h about 236 km
								0 = 21 18 03.1
23 Dec		eP	23 11 13.3	4	1.0		T	
24 Dec		eP	00 30 37.6	5	1.1		T	
24 Dec		eP	02 12 21.2	6	1.0	NW	T	
		e	13 10.9		1.2			
24 Dec		ePP	03 00 08.5		1.1		T	New Guinea
		ePKKP	09 27.3		1.5			3.4 S 140.3 E
	LP	ePKKP	58		24.0			h about 29 km
	LP	eSur	35 57					0 = 02 40 07.6
								Strong surface waves, Rayleigh type, on LP.

DATE	Syst.	Phase	Arrival Time G.C.T.	Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h. m. s.					
24 Dec		eP	04 03 33.8	1	0.5		T	
		e	50.0		0.6			
24 Dec		eP	04 03 52.5	5	0.8		T	Possible phase of previous event
24 Dec		eP	04 11 29.1	2	0.8		T	
24 Dec	LP	eSur	04 47 11				T	New Guinea
								3.2 S 140.1 E
								h about 39 km
								0 = 03 50 45.6
								Weak surface waves, Rayleigh type, on LP.
24 Dec		eP	04 27 14.2	2	0.7		T	
24 Dec		eP	04 36 18.5	3	1.0		T	
24 Dec		eP	05 36 24.8	5	1.3		T	
		e	37 44.9		1.4			
24 Dec		eP	07 03 09.7	52	1.2		T	Near coast of northern Hokkaido, Japan
		e	40.0		1.2			43.8 N 143.9 E
		e	04 27.3		1.2			h about 79 km
								0 = 06 50 48.4
24 Dec		eP'	07 32 10.6	3	0.8		T	Nepal
		ePP	33 18.0		1.2			29.5 N 80.9 E
		ePKKP	42 45.4		0.9			h about 20 km
								0 = 07 13 25.4
24 Dec		eP	09 31 59.6	8	1.2		T	Tonga Islands
		e	32 09.8		1.3			20.4 S 173.6 W
		e	33 30.6		1.0			h about 45 km
	LPN	eSKS	42 26		27.0			0 = 09 19 02.7
	LPN	ePS	43 55		28.0			Medium surface waves on LP.
	LP	eSur	10 03 36					

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
24 Dec		eP	09	56	24.0	7	1.1		T	
24 Dec		eP	12	06	17.4	9	1.2		T	
24 Dec		eP	14	03	37.0	1	0.3		NR	△(S-P) = 4.8°
		e			39.5		0.5			
		e			47.0		0.4			
	E	eS		04	33.0		0.4			
	E	eSur		05	05.9		0.5			
24 Dec		eP	14	33	33.1	24	0.9		T	Near coast of northern Peru
		e		34	49.0		1.3			5.7 S 80.9 W
	LP	ePP		35	23		17.0			h about 52 km
		eScP		39	23.0		1.5			0 = 14 25 32.7
		e			49.6		1.5			Strong surface waves,
	LPN	eS		40	04		23.0			Rayleigh type, on LP.
	LPN	eScS		43	25		22.0			
	LPN	e(Sur)		46	10					
	LP	eSur		49	10					
24 Dec		eP	15	12	03.5	1	0.7		T	
24 Dec		eP	16	50	08.3	2	1.0		R	
	E	eSur		52	39.1		1.0			
24 Dec		eP	17	23	47.6	6	0.8		T	Near coast of northern Peru
		e			56.5		0.8			6.0 S 81.7 W
		e		24	21.8		1.1			h about 25 km
		ePcP		25	34.7		0.8			0 = 17 15 41.7
		e			41.3		0.9			
24 Dec		eP	19	39	54.3	6	1.2		T	
24 Dec		eP	20	38	22.2	7	1.0		T	
		e		39	10.4		0.9			
24 Dec		eP	23	55	03.9	35	1.6		T	Near coast of Chile
		e			11.0		1.0			38.3 S 74.6 W
		e(pP)			19.0		2.2			h about 31 km
										0 = 23 43 19.2
										Medium surface, Rayleigh type, on LP at 00 18 00.

(continued on next page)

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
		e		56	16.9		0.9			(continued from preceding page)
25 Dec	LPN	eS	00	04	48		20.0			
	LPN	eSS		09	15		24.0			
	LPN	eSSS		12	48		22.0			
	LPN	eSur		15	24					
	LP	eSur		18	00					
25 Dec		eP	01	15	50.7	12	1.3		T	
25 Dec		eP	01	49	57.6	9	1.2		T	
25 Dec		eP	04	28	56.4	12	0.7		T	
25 Dec		eP	06	33	48.0	1	0.4		T	
25 Dec		eP	06	33	50.7	5	0.7	S	T	
		e		34	07.6		0.6			
25 Dec		eP'	08	20	02.8	176	2.5		T	Ceram Sea
		e		22	35.8		1.1			3.7 S 127.7 E
		eSKP		23	20.0		1.5			h about 47 km
		e		25	51.5		1.7			0 = 08 00 59.3
	LP	eSur	09	04	00					Medium surface waves on LP.
25 Dec		eP'	08	32	17.9	2	0.9		T	Spice Islands
										1.1 S 126.7 E
										h about 25 km
										0 = 08 13 07.2
25 Dec		eP	09	03	57.0	5	0.8		T	South of Panama
		e		04	10.0		1.0			6.4 N 82.2 W
		e			21.8		1.2			h about 77 km
		ePP		05	01.2		1.0			0 = 08 57 39.1
		ePcP		06	54.6		0.8			
25 Dec		eP	09	09	57.4	11	1.1		T	Possible phase of Panama event

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
25 Dec		eP'	09	28	11.0	18	1.2		T	Ceram Sea 3.7 S 127.7 E h about 54 km 0 = 09 09 07.4
25 Dec		eP'	09	33	16.0	15	0.8		T	Ceram Sea 3.8 S 127.5 E h about 42 km 0 = 09 14 12.1
25 Dec		eP'	09	40	30.2	4	1.0		T	Ceram Sea 3.7 S 127.3 E h about 27 km 0 = 09 21 22.5
25 Dec		eP	12	21	25.8	1	0.3		NR	Kansas-Missouri
		e			29.0		0.4			38.9 N 94.6 W
		e			31.6		0.4			h about 25 km
		e			47.6		0.4			0 = 12 20 05.0
		eS		22	29.3	999				Surface at 12 23 00.6 is Lg.
	E	eSur		23	00.6	999				
25 Dec		eP	12	59	44.0	1	0.3		NR	Kansas-Missouri
		e			47.6		0.5			38.9 N 94.6 W
		e			49.6		0.3			h about 20 km
		e			54.3		0.2			0 = 12 58 22.7
		e	13	00	07.0		0.6			Surface at 13 01 21.0 is Lg.
		eS			48.0	999				
	E	eSur		01	21.0	999				
25 Dec		eP	14	08	25.0	5	0.9		T	Tonga Islands
		e			30.9		1.4			20.4 S 173.7 W
		e			46.4		1.4			h about 64 km
		ePP		12	01.7		1.8			0 = 13 55 38.8
	LPN	eS		19	25		17.0			Weak surface waves on LP.
		ePKKP		26	06.2		0.8			
		e			21.6		1.0			
	LP	eSur		37	00					

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
25 Dec		eP	14	32	56.8	1	0.6		T	
		e		33	11.2		1.1			
25 Dec		eP	15	35	55.5	1	0.5		R	
		e		36	01.3		0.6			
		e			15.5		0.5			
	E	eSur		39	33.7		0.7			
25 Dec		eP	20	04	43.0	1	0.7		T	
		e			50.6		0.8			
		e		05	24.0		0.7			
		e			44.3		0.6			
		e		06	01.8		0.5			
	E	eSur		10	14.0		0.9			
25 Dec		eP	21	59	51.1	2	0.6		T	Hokkaido, Japan 44.3 N 142.7 E h about 250 km 0 = 21 47 49.3
25 Dec		eP'	22	44	21.8	1	0.5		T	Off coast of Java
		epP'		45	05.2		0.7			8.9 S 110.2 E h about 155 km 0 = 22 25 00.2
25 Dec		eP	22	53	41.6	7	0.6	SE	T	
26 Dec		eP	00	30	49.9	2	0.7		T	
26 Dec		eP	01	19	20.4	3	0.5	SE	T	
26 Dec		eP	04	31	10.2	2	0.4		NR	$\triangle$(S-P) = 1.6°
		e			14.1		0.4			
	E	eS			31.0	999				

DATE	Syst.	Phase	Arrival Time G.C.T.			Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h.	m.	s.					
26 Dec		eP'	04	43	20.7	9	0.9		T	Java Sea
		e			57.2		0.9			5.5 S 110.7 E
		e		44	09.4		0.9			h about 566 km
		epP'		45	32.3		1.7			0 = 04 24 55.4
		eSKP		46	00.7		1.2			
		eSKP			11.9		1.3			
		e(PKS)		47	10.9		1.0			
		e		48	16.2		1.5			
		e		54	41.9		0.8			
		ePcPP'		55	25.2		1.3			
26 Dec		eP	05	15	54.8	2	0.8		T	
26 Dec		eP	05	27	55.4	2	0.8		T	
26 Dec		eP'1	06	37	13.5	15	1.1		T	Prince Edward Islands region
		eP'2			22.7	45	1.1			44.2 S 38.1 E
		e			44.0		2.0			h about 22 km
		e		38	41.2		1.9			0 = 06 17 30.6
		e		40	15.7		1.7			Strong surface waves
		ePP			43.3		1.8			on LP
	LPN	eSur	07	17	00					
	LP	eSur		24	40					
26 Dec		eP	06	55	52.3	4	1.0		T	
26 Dec		eP	08	16	51.1	2	1.0		T	
26 Dec		eP	18	01	50.4	2	0.3		NR	Quarry blast near
		e			59.9		0.3			Chico, Texas
	E	eS		02	12.0	999				$\triangle$(S-P) = 1.5°
26 Dec		eP	18	18	26.9	2	0.4	SE	NR	Quarry blast near
		e			35.7		0.5			Chico, Texas
	E	eS			48.1	999				$\triangle$(S-P) = 1.5°
27 Dec		eP	00	01	34.8	3	1.0		T	

DATE	Syst.	Phase	Arrival Time G.C.T.			Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h.	m.	s.					
27 Dec		eP	02	26	20.7	7	0.8		T	Near Chile-Bolivia border
		ePcP			57.1		0.8			22.3 S 67.6 W
		ePP		28	38.4		1.0			h about 47 km
										0 = 02 15 49.2
27 Dec		eP	09	18	16.9	3	1.0		T	
27 Dec		eP	09	42	26.1	16	1.0	S	T	
		e		43	08.4		0.8			
		e			52.7		0.8			
		e		50	51.1		0.9			
27 Dec		eP	10	17	41.9	2	1.0		T	
27 Dec		eP	12	03	59.0	1	0.7		T	Tonga Islands region
										17.6 S 173.5 W
										h about 25 km
										0 = 11 51 06.9
27 Dec		eP	15	30	19.0	3	0.6		T	Near east coast of
										Kamchatka
										53.4 N 160.3 E
										h about 35 km
										0 = 15 19 15.8
27 Dec		eP	15	41	29.7	6	0.6	SE	T	Regional by surface
		e			57.3		0.9			-P interval.
	E	eSur		45	27.3		0.6			
27 Dec		eP	16	55	54.5	1	0.6		T	
27 Dec		eP	16	59	17.2	20	1.1		T	Atlantic Ocean, north
		e			23.6		1.5			of Ascension Island
		e			54.7		1.5			1.7 S 12.9 W
		e	17	00	25.5		1.5			h about 37 km
	LPN	eSur		27	50					0 = 16 46 31.2
	LPE	eSur		30	06					Strong surface waves
										on LP

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
27 Dec		eP	18	01	11.7	1	0.3		NR	△(S-P) = 2.1°
		e			25.5		0.3			
		e			31.5		0.4			
	E	eS			37.6		0.4			
27 Dec		eP	18	29	45.7	5	1.2		T	
27 Dec		eP	18	52	17.0	1	0.7		T	
		e			46.4		0.6			
27 Dec		eP	19	49	02.0	8	0.7	NNE	T	
		e		51	34.9		0.7			
27 Dec		eP	23	36	50.0	1	0.4		NR	△(S-P) = 2.6°
	E	eS		37	22.3		0.4			
28 Dec		eP'	00	06	32.2	4	1.2		T	Near coast of North Island,
	LP	ePP		07	10		18.0			New Zealand.
		e(SKP)		09	41.7		1.5			41.2 S 175.7 E
	LPN	eSKS		13	09		24.0			h about 57 km
	LPN	ePS		16	16		26.0			0 = 23 48 01.3
		$ePKKP_1$		17	41.8		1.2			Mag. = 6-3/4 (Pas),
		$ePKKP_2$			53.5		1.2			6 - 6-1/4 (Pal.)
	LPN	e		19	20		22.0			Strong surface waves,
		e		20	13.6		1.4			Rayleigh type, on LP and BE
	LPN	ePKKS		21	24		20.0			
	LPN	eSS		23	04		20.0			
	LP	eSur		38	50					
28 Dec		eP	00	56	22.0	2	0.7		R	
		e			32.5		0.7			
	E	eSur	01	00	04.6		1.2			
28 Dec		eP	01	55	15.1	1	0.6		T	
28 Dec		eP	05	20	28.1	2	0.9		T	

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
28 Dec		eP	05	57	17.0	28	1.4	SE	T	
		e			42.8		1.3			
28 Dec		eP	06	22	08.8	2	0.6		T	Start very indefinite
		e		27	38.1		0.8			
28 Dec		eP	07	20	21.2	2	1.1		T	
		e		25	19.3		1.5			
28 Dec		eP	16	09	56.2	4	1.2		T	
		e		10	56.0		1.6			
28 Dec		eP	16	35	27.3	3	1.1		T	
28 Dec		eP	17	26	44.0	2	0.5		R	
		e		27	30.4		0.4			
	E	eSur		28	00.2		0.6			
28 Dec		eP	17	35	27.4	4	0.4	E	NR	Quarry blast near
		e			28.9		0.5			Fitzhugh, Oklahoma
		eS			48.4	999				△(S-P) = 1.6°
		e			51.4	999				
28 Dec		eP	18	06	04.2	2	0.3	ESE	NR	Quarry blast near
		e			14.4		0.3			Chico, Texas
		eS			26.3	999				△(S-P) = 1.5°
28 Dec		eP	19	26	43.8	1	0.6		T	
		e			58.9		0.6			
28 Dec		iP	22	12	03.9	c 6	0.3	SE	L	Local artillery fire with
		eS			05.2	999				acoustic waves recorded
										about 30" later
										(S-P) = less than 0.1°
										Series of similar events
										occur.
28 Dec		eP	22	40	55.2	1	0.6		T	

DATE	Syst.	Phase	Arrival Time G.C.T.	Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h. m. s.					
28 Dec		eP	23 04 51.5	8	1.3		T	
29 Dec		eP	00 00 33.6	1	0.5		NR	△(S-P) = 2.6°
	E	eS	01 05.3		0.5			
29 Dec	LPN	ePS	00 22 26		30.0		T	Santa Cruz Islands region
	LPN	ePPS	23 13		23.0			12.4 S 166.3 E
		ePKKP	26 13.3		0.9			h about 100 km
	LPN	eSS	28 51		30.0			0 = 23 55 57.6
		e	30 08.0		1.4			Strong surface waves on LP.
	LPN	e(Sur)	38 20					Phase reported as PKKP
	LPN	eSur	42 24					may be new.
29 Dec		eP	01 29 21.4	1	0.7		T	
		e	36.2		0.7			
29 Dec		eP	01 40 07.1	3	0.8		T	
		e	12.8		0.6			
29 Dec		eP	02 46 08.3	3	1.0		T	
29 Dec		eP	06 21 35.6	2	0.8		T	
29 Dec		eP	08 12 47.7	3	1.0		T	Hokkaido, Japan
								42.6 N 142.7 E
								h about 43 km
								0 = 08 00 08.9
29 Dec		eP	14 58 00.4	100	1.1		T	Off coast of Guatemala
	E	eSur	15 01 55.5		0.9			13.6 N 92.4 W
								h about 37 km
								0 = 14 53 12.3
								Strong surface waves on
								SP, IB and LP.
								Weak surface on BB.
29 Dec		eP	15 44 50.0	8	1.0		T	
		e	45 28.4		0.6			
		e	46 08.0		0.8			

DATE	Syst.	Phase	Arrival Time G.C.T.	Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h. m. s.					
29 Dec		eP	15 59 45.8	2	0.9		T	
29 Dec		eP	16 57 18.4	1	0.6		T	
29 Dec		eP	21 09 22.6	1	0.5		NR	△(S-P) = 3.1°
		e	26.2		0.5	ENE		
	E	e	29.9		0.5			
		e	40.9		0.5			
	E	eS	59.2		0.4			
		e	10 13.2		0.4			
	E	e	16.5		0.4			
29 Dec		eP	21 48 07.7	4	1.0		T	
29 Dec		eP	22 06 56.1	4	1.2		T	
29 Dec		eP	22 10 21.8	3	0.9		T	
29 Dec		eP	22 45 54.5	1	0.4	N	L	△(S-P) = less than 0.1°
		eS	58.3	999				
29 Dec		eP	23 09 11.8	1	0.3	SE	NR	△(S-P) = 2.2°
	E	eS	38.3		0.4			
29 Dec		eP	23 42 16.5	1	0.3		NR	△(S-P) = 2.7°
	E	eS	48.9		0.5			
	E	e	50.2		0.4			
30 Dec		eP	00 02 18.8	3	1.0		T	
30 Dec		eP	00 49 27.8	999	1.0		T	Rat Islands, Aleutians
	LPE	eS	57 40		31.0			52.3 N 177.7 E
	LPN	eSS	01 01 56		28.0			h about 52 km
	LPE	eSur	04 20					0 = 00 39 24.1
	LP	eSur	05 40					Strong surface waves
		eP'P'	19 03.5		1.2			on all systems
		e	21 25.0		2.0			Mag. 6-3/4 (Pas), 6-1/2 (Berk)
								and 7 (Pal.)

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
30 Dec		eP	04	17	22.1	5	1.0		T	
30 Dec		eP	07	01	45.6	5	0.7		R	
		eSur		05	34.0		1.0			
30 Dec		eP'	07	26	49.7	2	0.8		T	Sinkiang Province, China
	LPN	ePS		36	20		20.0			39.7 N 77.7 E
	LPN	e(Sur)		48	40					h about 35 km
	LP	eSur	08	08	00					0 = 07 08 29.1
										Medium surface waves, Rayleigh type, on LP.
30 Dec		eP	09	03	19.1	7	0.9		T	Rat Islands, Aleutians
	LPN	eSur		16	10					51.9 N 177.6 E
	LPN	eSur		18	18					h about 67 km
	LP	eSur		23	40					0 = 08 53 14.4
										Weak surface waves on LP.
30 Dec		eP	09	12	41.2	15	1.3		T	Tonga Islands
		e			54.3		1.0			22.9 S 175.2 W
		e		13	10.6		1.0			h about 41 km
	LP	eSur		43	00					0 = 08 59 31.7
										Weak surface waves on LP.
30 Dec		eP	09	27	17.5	3	0.7		T	Rat Islands, Aleutians
										52.3 N 179.7 E
										h about 57 km
										0 = 09 17 21.1
30 Dec		eP	09	45	00.6	3	1.0		T	
30 Dec		eP	10	24	43.4	4	1.0		T	Rat Islands, Aleutians
	LPN	e(Sur)		38	20					52.0 N 178 2 E
	LP	eSur		45	00					h about 62 km
										0 = 10 14 37.2
										Medium surface waves, Rayleigh type, on LP.

DATE	Syst.	Phase	Arrival Time G.C.T. h.	m.	s.	Ground Motion A	T	Dir.	Type	Remarks
1961										
30 Dec		eP	11	49	01.4	3	0.8		T	
		e			21.4		1.0			
30 Dec		eP	13	14	38.2	13	1.0		T	
30 Dec		eP	16	01	45.7	9	1.0		T	
30 Dec		eP	16	47	20.6	1	0.6		T	
30 Dec		eP	16	51	56.7	25	1.5		T	Rat Islands, Aleutians
		e		52	24.4		1.5			51.7 N 178.5 E
	LPN	eSur	17	08	00					h about 63 km
	LP	eSur		11	00					0 = 16 41 51.5
										Strong surface waves, Love and Rayleigh, on LP.
30 Dec		eP	18	33	05.1	2	0.3	SE	L	△(S-P) = 1.3°
		e			15.0		0.2			
	E	eS			21.7		0.3			
30 Dec		eP	18	47	24.7	1	0.7		T	
		e			48.6		0.9			
30 Dec		eP	19	18	49.1	3	0.8		T	
		e		19	46.7		1.1			
30 Dec		eP	19	32	11.8	2	0.7		T	
		e			20.0		0.6			
30 Dec		eP	19	51	18.6	1	0.4		NR	△(S-P) = 2.8°
	E	eS			47.4		0.4			
	E	e			55.3		0.4			
	E	e		52	03.8		0.6			
30 Dec		eP	20	07	37.4	1	0.3	S	L	Quarry blast near Chico, Texas
		e			38.5		0.4			
	E	eS			56.0		0.3			△(S-P) = 1.4°

DATE	Syst.	Phase	Arrival Time G.C.T.	Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h. m. s.					
30 Dec		eP	21 52 12.3	5	1.0		T	
30 Dec		eP	22 21 32.0	1	0.3		NR	Blast near Keystone Dam
	E	eS	22 04.0		0.5			area, Oklahoma
								$\triangle$(S-P) = 2.6°
30 Dec		eP	22 23 14.0	2	0.7		T	
		e	29.6		0.8			
30 Dec		eP	23 10 14.2	1	0.5		R	
	E	eSur	11 22.0		0.7			
30 Dec		eP	23 12 43.8	2	0.8		T	
		e	13 03.0		1.0			
30 Dec		eP	23 29 07.8	10	1.6		T	North Atlantic Ocean
		e	30 03.7		2.0			16.5 N 46.6 W
		e(PcP)	26.7		1.0			h about 32 km
	LP	eSur	43 50					0 = 23 20 16.9
								Strong surface waves,
								Rayleigh type, on LP.
30 Dec		eP	23 36 13.5	1	0.4		NR	$\triangle$(S-P) = 2.7°
	E	eS	45.8		0.5			
31 Dec		eP	00 02 18.4	1	0.5		NR	$\triangle$(S-P) = 1.5°
	E	eS	37.8		0.5			
31 Dec		eP	00 54 33.9	2	0.6		T	
31 Dec		eP	02 03 24.4	2	0.9		T	
31 Dec		eP	02 29 18.8	3	1.1		T	
31 Dec		eP	04 45 41.6	5	1.2		T	
31 Dec		eP	05 01 30.0	3	0.9		T	
31 Dec		eP	05 46 38.3	1	0.7		T	
		e	43.4		1.7			

DATE	Syst.	Phase	Arrival Time G.C.T.	Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h. m. s.					
31 Dec		eP	06 49 28.4	2	0.8		T	
31 Dec		eP	08 49 31.9	3	1.1		T	
		e	55.3		1.0			
31 Dec		eP	09 08 56.8	5	0.9		T	
31 Dec		eP'	14 04 43.0	4	1.1		T	Halmahera
		ePP	06 26.2		1.5			1.6 N 127.3 E
		ePKKP	14 30.8		0.6			h about 140 km
								0 = 13 46 01.8
31 Dec		eP	16 05 50.9	8	1.2		T	
31 Dec		eP'	16 27 19.1	20	1.0		T	Near coast of Java
		e	31.9		0.9			7.8 S 106.8 E
								h about 66 km
								0 = 16 07 46.4
31 Dec		eP	16 38 22.1	3	0.7		R	Central South Dakota
		e	33.0		0.9			44.4 N 100.5 W
		e	54.4		0.6			h about 16 km
		e	39 02.6		0.9			0 = 16 35 58.7
	E	eS	40 08.5	999				Strong surface waves,
		eSur	41 23.3	999				Lg type, on SP and IB.
								Weak surface on BB.
31 Dec		eP	17 57 43.8	5	1.0		T	Fox Islands, Aleutians
		e	58 13.4		0.9			51.8 N 171.2 W
								h about 47 km
								0 = 17 48 27.8
31 Dec		eP	18 01 27.3	1	0.3		NR	$\triangle$(S-P) = 1.5°
	E	eS	46.6		0.3			

DATE	Syst.	Phase	Arrival Time G.C.T.	Ground Motion A	Ground Motion T	Dir.	Type	Remarks
1961			h. m. s.					
31 Dec		eP	18 08 33.2	273	2.0		T	Off coast of Mexico
		e	09 09.7		1.3			18.2 N 105.8 W
		e	47.6		1.3			h about 32 km
	LPN	eSur	13 21					0 = 18 04 25.4
	E	eSur	14 03.0		6.0			Strong surface waves on BB and LP. Weak surface on IB and SP.
31 Dec		eP	19 51 08.9	3	1.1		T	Possible new event at
		e	53 22.7		1.1			20 03 01.0.
		e	20 03 01.0		1.2			