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ARCATA--BERKELEY--CALISTOGA--CONCORD

FRESNO--LLANADA--MANZANITA LAKE

MINERAL--MOUNT HAMILTON--PALO ALTO--PARAISO

POINT REYES--PRIEST--SAN FRANCISCO

SANTA CRUZ--SHASTA--VINEYARD

Earthquakes and the Registration of Earthquakes

From October 1, 1963 to December 31, 1963

By
Cinna Lomnitz,
Kenneth Casaday
and
Don Pershing

University of California
Berkeley
1966

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INTRODUCTION

Each quarterly issue of the Bulletin includes determinations of epicenters, origin times, magnitudes, and other information available at the time of writing, for earthquakes in northern California and adjoining areas. Recorded arrival times of seismic waves are tabulated only for the major earthquakes in the local area and for teleseisms.

Information items regarding the seismographic stations which comprise the Berkeley network are repeated in every issue. Information of a general nature, such as the Modified Mercalli Intensity Scale, will be found only in the first number of each volume.

PERSONNEL (June 1966)

Station Director	Bruce A. Bolt
Director Emeritus	Perry Byerly
Associate Research Seismologist	Cinna Lomnitz
Assistant Research Seismologist	Helen Freedman
Postgraduate Research Seismologist	David J. Sutton
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THE BYERLY SEISMOGRAPHIC STATION (BKS)

Standardized equipment began operating in a newly constructed tunnel east of the main campus on June 8, 1962. The closest buildings, part of the Lawrence Radiation Laboratory, are about 0.8 km away. The tunnel was cut into the upper part of the Claremont Formation. Of Miocene age, this formation consists of thin layers of cherty material alternating with shale.

A plan of the tunnel is shown in the diagram. Piers are constructed of reinforced concrete with no isolation from floor and walls. The temperature is stable. A ventilating and dehumidifying system is connected to all rooms.

The short-period world-wide standard instruments are operated with an approximate magnification of 25,000 at 1 sec and the long-period standard instruments with 3,000 at 30 sec.

On March 20, 1964, the Regents of the University of California named this station the "Byerly Seismographic Station" in recognition of the work of Professor Perry Byerly.

HISTORY OF THE UNIVERSITY OF CALIFORNIA STATIONS

"The Seismographic Stations at Mount Hamilton and Berkeley present several items of interest in the history of earthquake science, one of which is that according to the available records they were the first seismographic stations set up in America. Furthermore, they have functioned continuously from their founding to the present day, with improvements in instrumental equipment from time to time as the development of the science and opportunity have permitted.

"Several outstanding figures in the seismology of the 1880's were impressed with the importance of these stations, and Ewing, Milne, and Gray each took a personal interest in aiding one or both stations to obtain their own best and most modern types of instruments."

The quotation is from "History of the University of California Seismographic Stations and Related Activities" by Professor George D. Louderback, published in the Bulletin of the Seismological Society of America, Vol. 32, No. 3, pp. 205-229, 1942. In this paper may be found a detailed account of the development of the Berkeley stations from the installation of the instruments (the first earthquake known recorded at Mount Hamilton was on April 24, 1887) to 1942.

Since 1942, the number of seismographic stations associated with the University of California has increased from six to twenty in 1962. In 1950, Professor Perry Byerly was appointed Director by the Regents; he had been in charge of instruction and research since 1925. In 1960, the University entered into a contract with the Air Force Office of Scientific Research of the Research Projects Agency of the Department of Defense. Funds were made available under the Vela Uniform program to design and operate a telemetered network of eight new stations in central California and to construct a new seismic vault near the Berkeley campus.

STATIONS IN OPERATION: OCTOBER - DECEMBER 1963

Station	North Latitude	West Longitude	Elev. Meters	Symbol	Present Auspices and Date Established
Berkeley (Haviland)	37° 52:4	122° 15:6	81	BRK, BRX	Univ. of California, 1887
Berkeley (Strawberry)	37° 52:6	122° 14:1	276	BKS	Univ. of California, 1962
Mt. Hamilton	37° 20:5	121° 38:5	1282	MHC	Lick Observatory, 1887
Palo Alto	37° 25:0	122° 10:9	83	PAC	Stanford University, 1927
San Francisco	37° 46:6	122° 27:1	100	SFB	Univ. of San Francisco, 1931
Fresno	36° 46:0	119° 47:8	88	FRE	Fresno City College, 1935
Mineral	40° 20:7	121° 36:3	1495	MIN	National Park Service, 1938
Arcata	40° 52:6	124° 04:5	59	ARC	Humboldt State College, 1948
Shasta	40° 41:7	122° 23:3	312	SHS	Bureau of Reclamation, 1942
Manzanita Lake	40° 32:2	121° 33:7	1800	MLC	National Park Service, 1956
Vineyard (local)	36° 45:0	121° 23:1	330	VIN	W. A. Taylor and Co., 1959
(telemeter)	36° 45:0	121° 23:3	380	VIT	
Concord	37° 58:1	122° 04:3	36	CNC	Diablo Valley College, 1960
Santa Cruz	37° 00:4	121° 59:8	128	SCC	City of Santa Cruz, 1961
Paraiso	36° 19:9	121° 22:2	363	PRS	Paraiso Hot Springs, 1961
Llanada	36° 37:0	120° 56:6	475	LLA	Charles McCullough Ranch, 1961
Calistoga	38° 38:2	122° 35:1	457	CLS	Terrance Kirk Ranch, 1961
Point Reyes	38° 04:8	122° 52:0	404	PRC	Federal Aviation Agency, 1961
Priest	36° 08:5	120° 39:9	1187	PRI	Federal Aviation Agency, 1961

STATION INSTRUMENTATION

October-December 1963

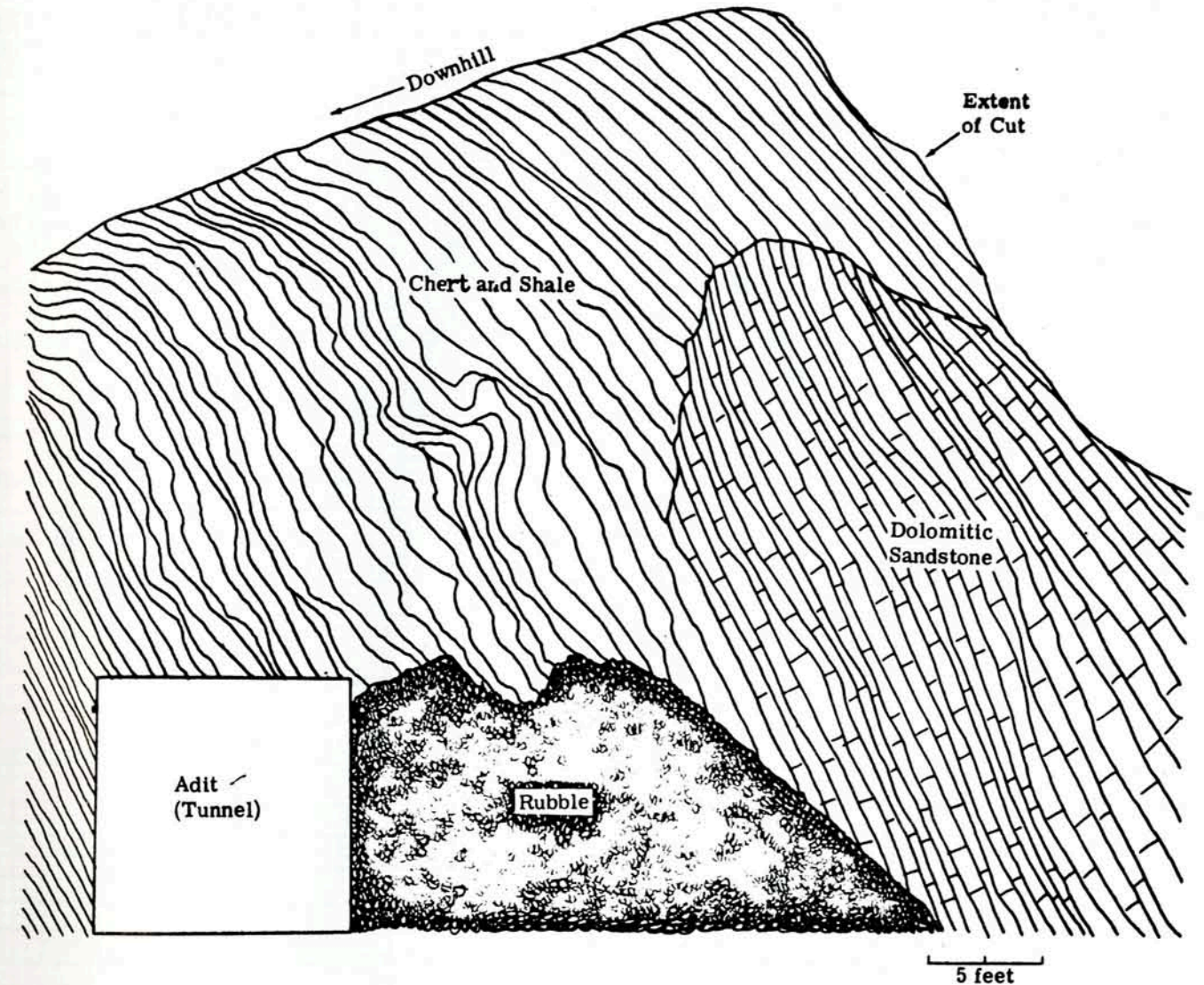
Station	Type of Instrument	T _o sec	T _g sec	Component
BRK [△]	Benioff 100 kg (Z)	1.0	0.2	Z
BRK	Benioff 100 kg (Z)	1.0	8.0	Z
	100X torsion	0.8	-	N,W
BKS	Benioff 100 kg Sprengnether	1.0	0.75	N,E,Z
	Wood-Anderson torsion	30	100	N,E,Z
		0.8	-	S,W
BRX	Galitzin-Wilip moving coil	12	12	N,E,Z
	Press-Ewing moving coil	30	90	N,E,Z
MHC	Benioff 100 kg (Z)	1.0	0.4	Z
	Wood-Anderson torsion	0.8	-	S,E
PAC	Benioff 100 kg (Z)	1.0	0.4	Z
	Wood-Anderson torsion	0.8	-	N,E
SFB	Lehner-Griffith moving coil	1.2	0.3	Z
	Wood-Anderson torsion	0.8	-	S,W
FRE	Sprengnether moving coil	2.0	2.0	N,E,Z
MIN	Benioff 100 kg (Z)	1.0	0.4	Z
	Wood-Anderson torsion	0.8	-	S,E
ARC	Marion-Slichter moving coil	1.1	0.2	Z
	Wood-Anderson torsion	0.8	-	N,E
SHS	Benioff 50 kg moving coil	1.5	0.45	N,E,Z
MLC	Loucks-Omori	3½	-	S,E
VIN	Benioff 100 kg (Z)	1.0	0.2	Z
	Wood-Anderson torsion	0.8	-	S,W
VIT [△]	Benioff 14 kg (Z)	1.0	0.2	Z
CNC [△]	Benioff 100 kg (Z)	1.0	0.2	Z
SCC [△]	Benioff 14 kg (Z)	1.0	0.2	Z
PRS [△]	Benioff 14 kg (Z)	1.0	0.2	Z
LLA [△]	Benioff 14 kg (Z)	1.0	0.2	Z
CLS [△]	Benioff 14 kg (Z)	1.0	0.2	Z
PRC [△]	Benioff 14 kg (Z)	1.0	0.2	Z
PRI [△]	Benioff 14 kg (Z)	1.0	0.2	Z

[△]Signals from these nine stations are transmitted via leased telephone lines to recorders at Berkeley.

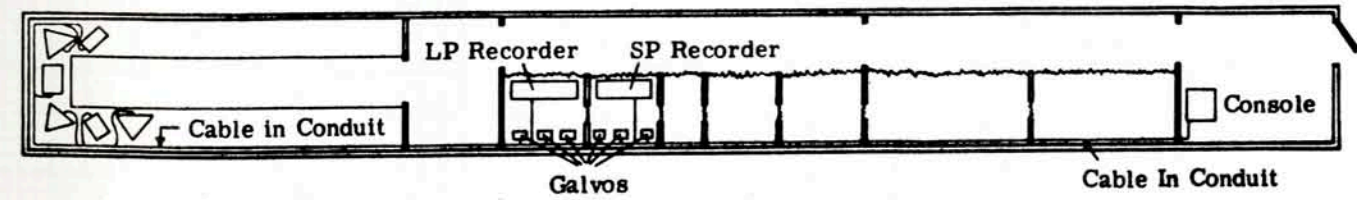
Direction of Motion: In the "Component" column, each horizontal component seismograph is designated by the direction of ground motion corresponding to upward trace motion on the seismogram when it is oriented so that time

increases from left to right. On all vertical component (Z) instruments, upward trace motion corresponds to upward ground motion.

Relative magnification curves of instruments recording through the tele-meter system are listed on the following pages. Absolute magnification may be obtained by use of calibration pulses recorded daily from each telemetered station.

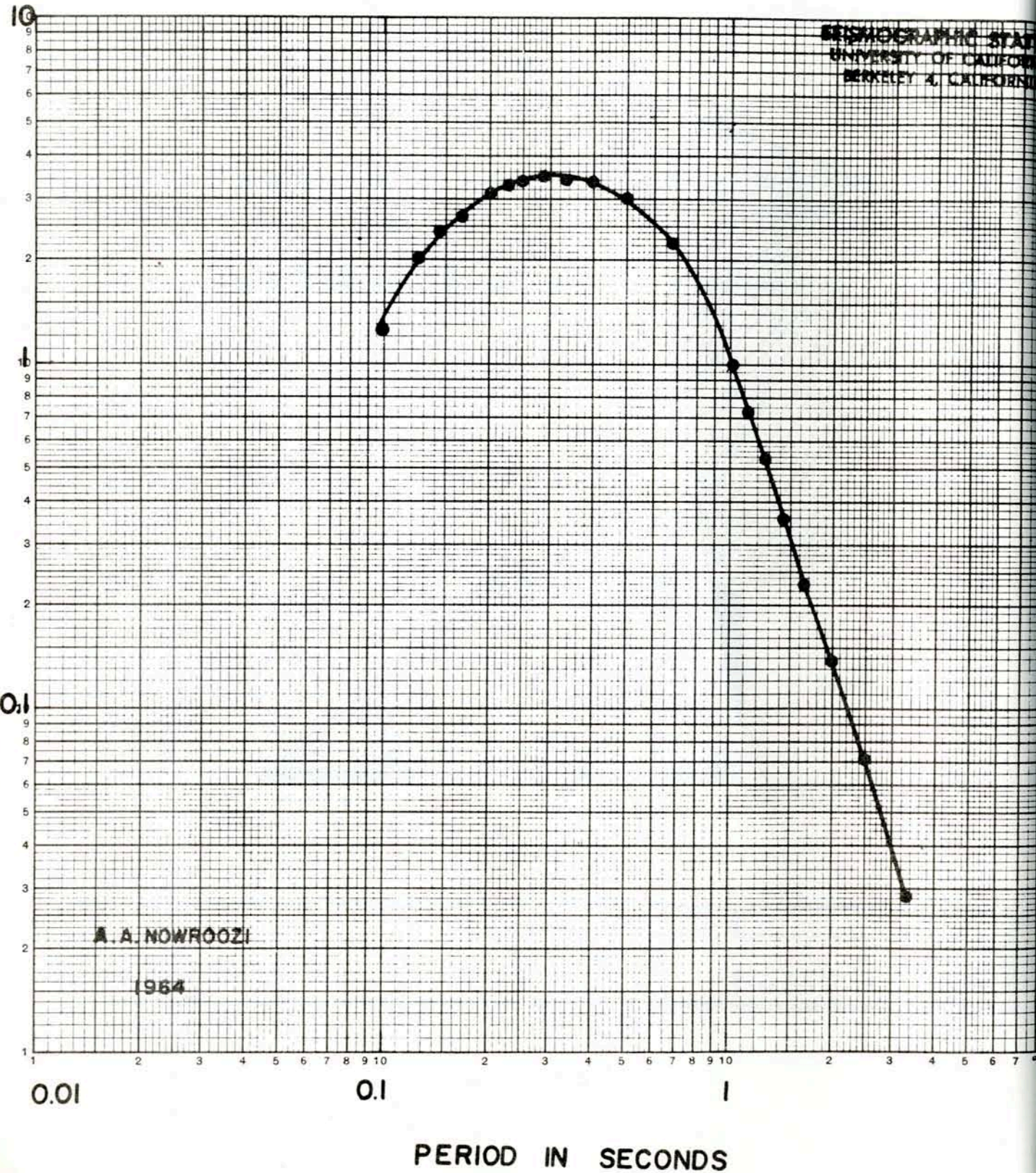


GEOLOGIC SECTION

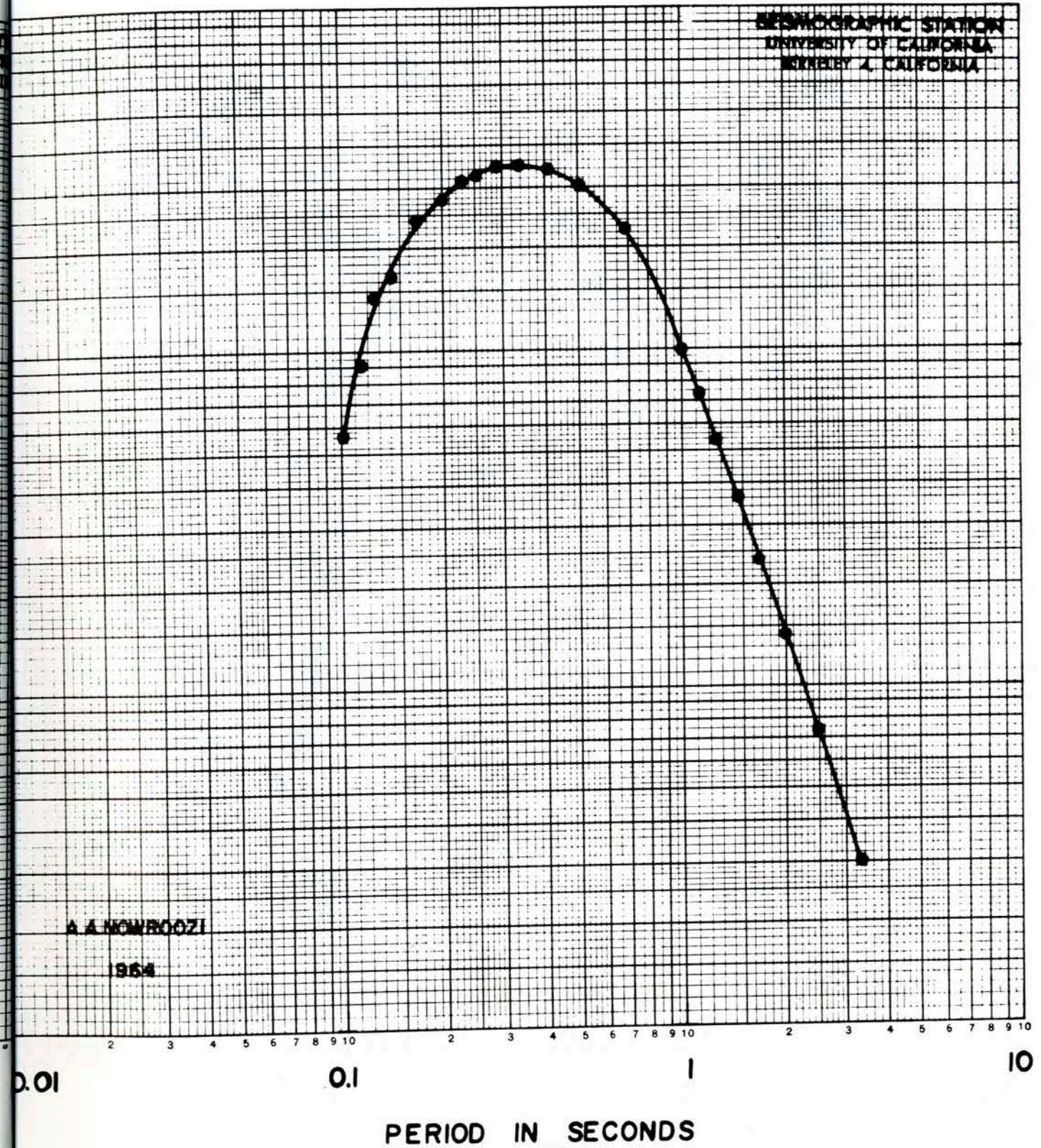


SEISMOLOGY TUNNEL

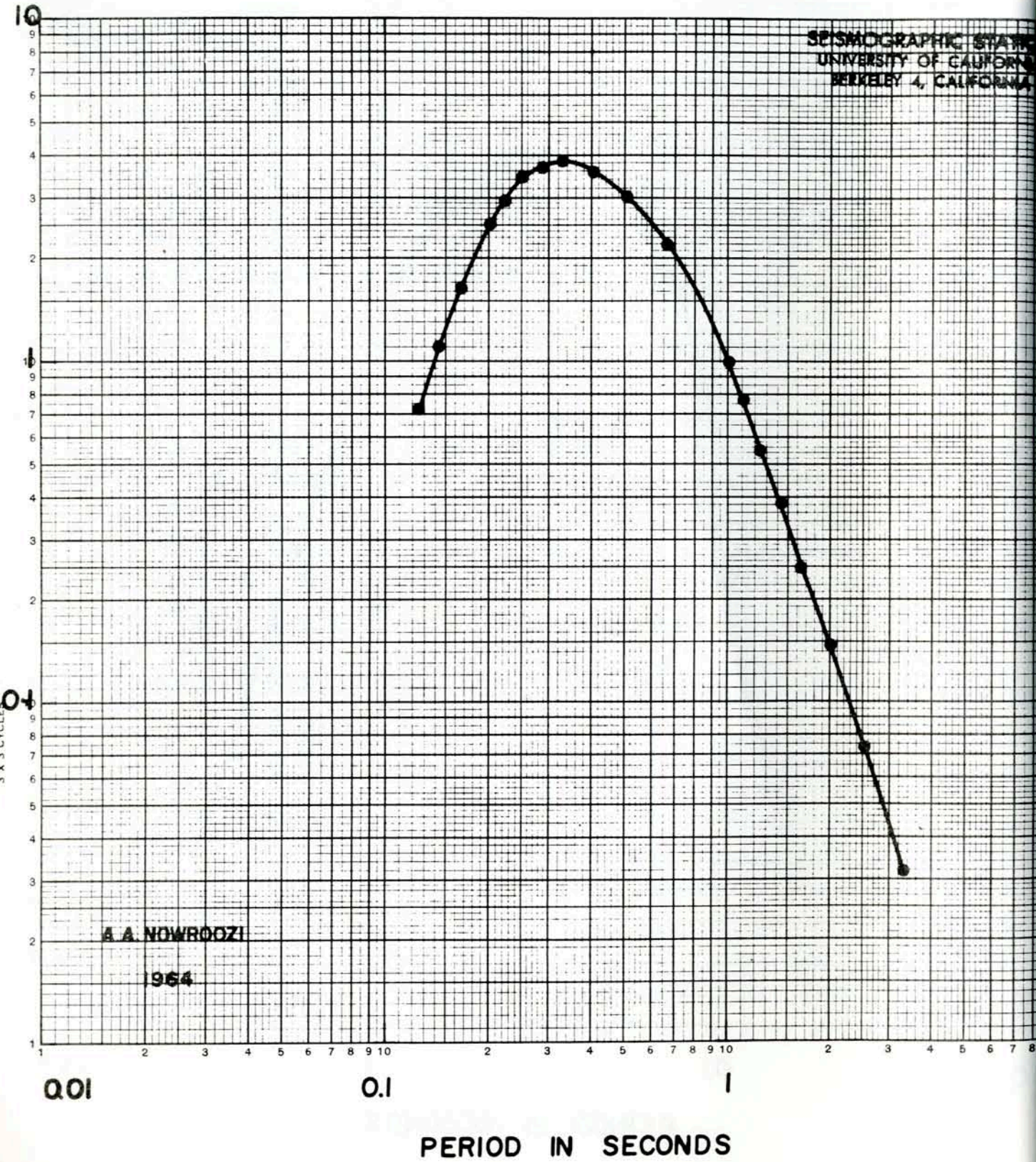
RESPONSE OF SEISMOMETER-DEVELOCORDER SYSTEM. 100KG. Z. S.P



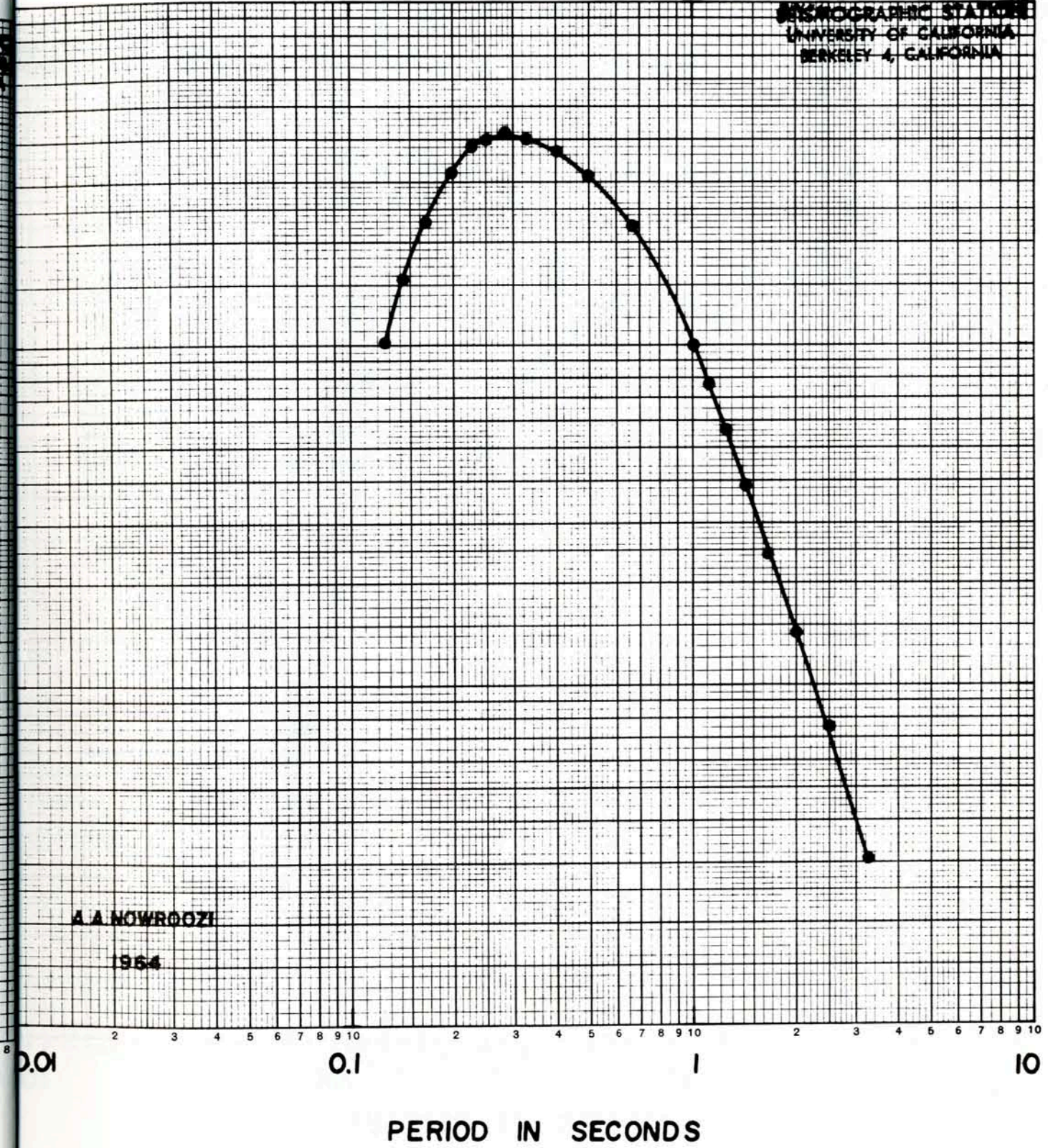
RESPONSE OF SEISMOMETER - HELICORDER SYSTEM. 100KG. Z. S.P



RESPONSE OF SEISMOMETER—HELICORDER SYSTEM. 14.7 KG. Z. S.P



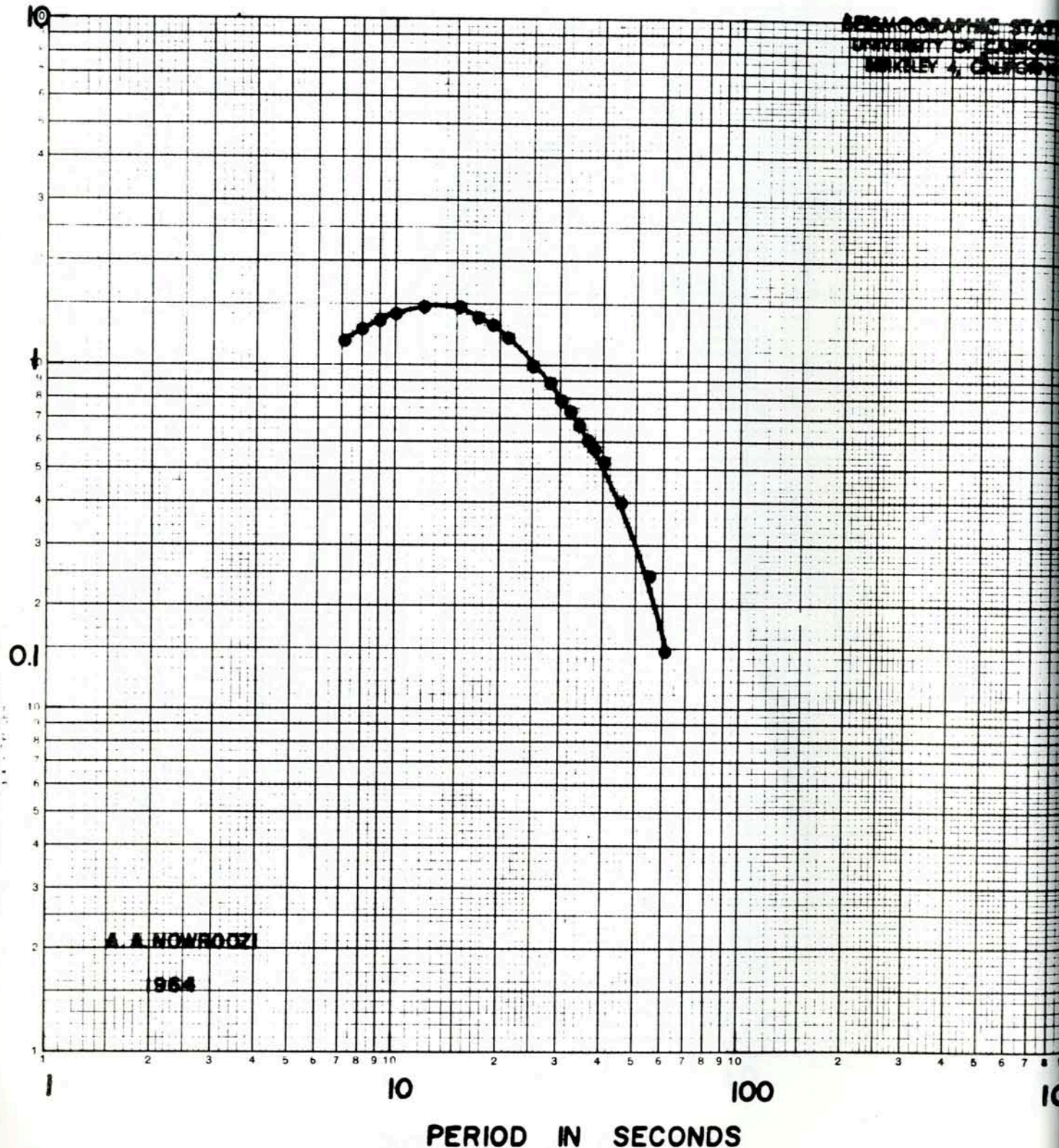
RESPONSE OF SEISMOMETER—DEVELOCORDER SYSTEM. 14.7 KG. Z. S.P



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KEUFFEL & ESSER CO. MADE IN U.S.A.
3 X 3 CYCLES

RESPONSE OF SEISMOMETER — HELICORDER
SYSTEM. PRESS-EWING.

Z. T.G=30 S., T.S=15 S.



PART I. LOCAL EARTHQUAKES IN NORTHERN CALIFORNIA, NEVADA, AND OREGON

This section includes information on earthquakes in northern California (including adjacent offshore areas) and in adjoining sections of Nevada and Oregon which were well enough recorded to permit a determination of the epicenter. Latitude and longitude of each epicenter and the corresponding date and origin time are tabulated in the following list; epicenters are also plotted on one or both of the two maps immediately following the list.

For the entire northern California region, every effort is made to list all earthquakes of Richter magnitude 3.0 and above, but it is likely that some such shocks have been omitted because the available seismographic data were inadequate for epicenter determination. Within the limited region covered by the map of the central Coast Ranges of California, locatable shocks of magnitude 2.5 and over are included in the tabulation and plotted on the map. Shocks of magnitude 3.0 and over occurring in the limited region are plotted on both maps. Shocks of magnitude less than 3.0 in northern California (and less than 2.5 in the central Coast Ranges) are tabulated only if reported felt or if of special interest for some other reason. Identified artificial earthquakes (explosions) ordinarily are not tabulated.

Epicenters are located by an IBM 7090 computer program. Information on Version I of this program may be found in "Computer Location of Local Earthquakes within the Berkeley Seismographic Network" by Bolt and Turcotte, published in *Computers in the Mineral Industries*, Part 2 (George Parks, Editor); Stanford University Publications, Geological Sciences, Vol. 9, No. 2, pp. 561-576, 1964.

Explanation of the table:

Map No. for each epicenter corresponds to the number plotted beside that epicenter on the maps. Epicenters without numbers lie outside the area of the map. The underlining of a map number in the table (and on the maps) indicates that one point on a map has been used to represent more than one earthquake in the table.

Date and Origin Time are given in Greenwich Civil Time (GCT). Subtract eight (8) hours to convert to Pacific Standard Time (PST).

M is the Richter magnitude of the earthquake as determined from the maximum trace amplitudes recorded for the shock by standard Wood-Anderson torsion seismographs.

h is the focal depth given to the nearest kilometer or by the following ranges: a, 0-5; b, 6-10; c, 11-15; d, 16-30 km.

No. of Stas. is the number of stations used by the computer program in locating the epicenter.

The quality of the solution is partially reflected by the listed number of stations. The highest quality locations are given to the nearest

minute of arc in latitude and longitude and to the tenth of a second origin time. Poorer quality locations are given to the nearest minute in latitude and longitude, to the nearest second in origin time, and are denoted by an asterisk.

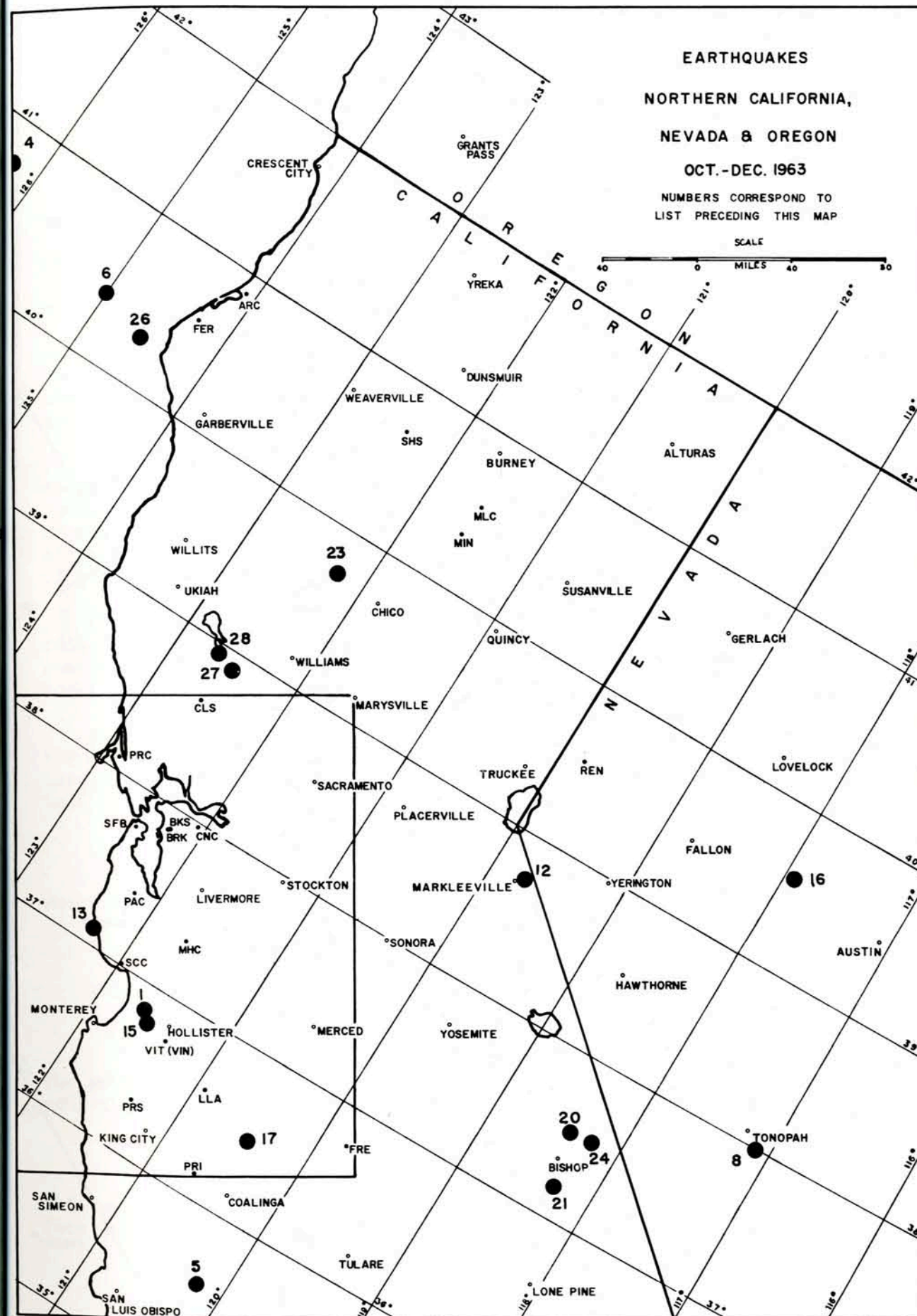
Under Remarks will be found a short descriptive location of the epicenter, usually relative to a point named on the map. Information on small foreshocks and aftershocks is sometimes included under Remarks, but when numerous foreshocks or aftershocks accompany a large earthquake, a separate tabulation may be included following the main list of local shocks.

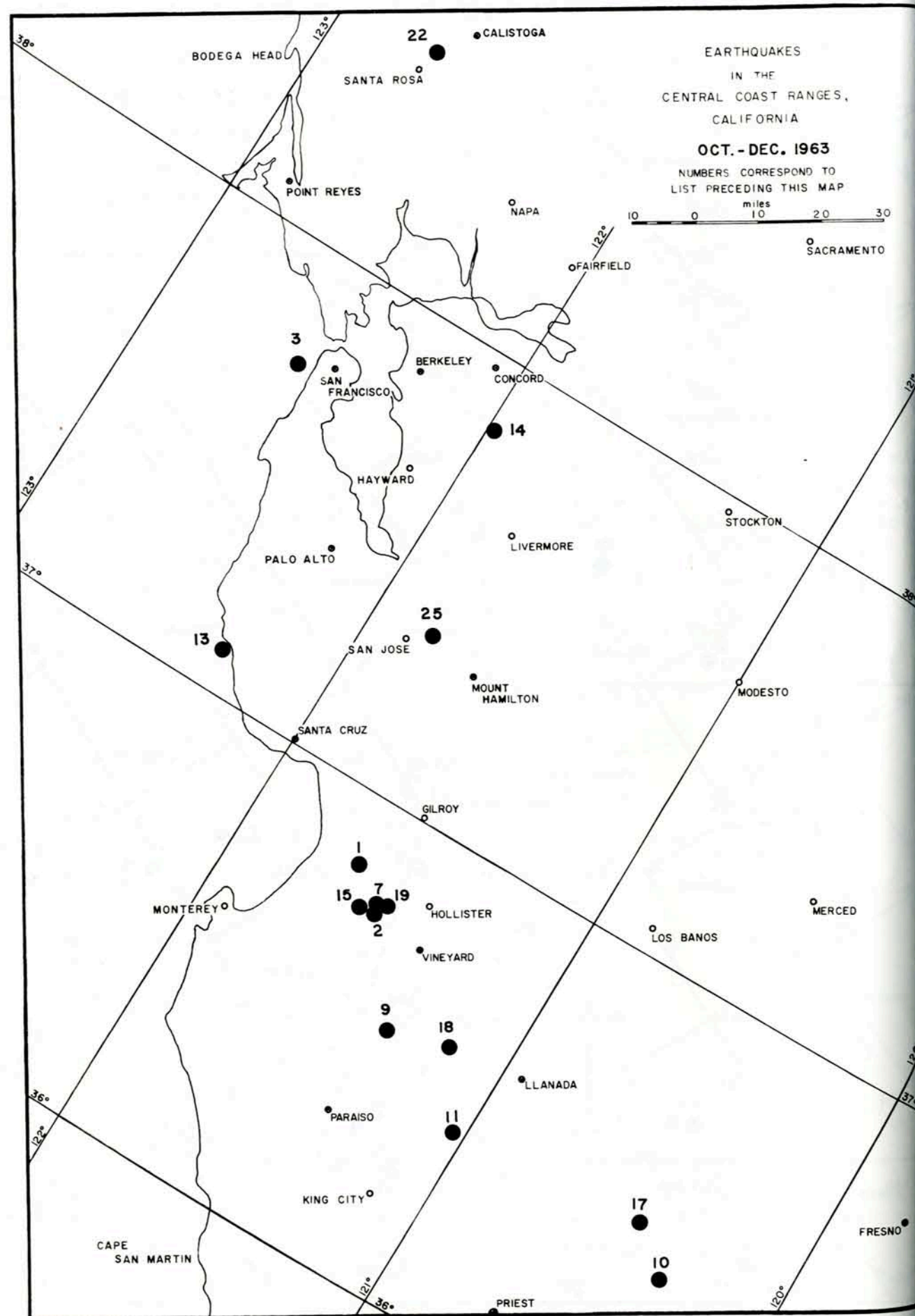
Information on maximum intensities of shocks reported felt is also included under Remarks. Reports on felt earthquakes may be obtained from the Seismological Field Survey of the U.S. Coast and Geodetic Survey, which publishes a more complete summary in "Abstracts of Earthquake Reports for the Pacific Coast and Western Mountain Region." This regular quarterly publication may be obtained from the District Officer, San Francisco District, Coast and Geodetic Survey, 121 Customhouse, San Francisco, California 94126, or from the Director, U.S. Coast and Geodetic Survey, Washington Science Center, Rockville, Maryland 20852. Intensities given in Roman numerals are assigned by the Coast and Geodetic Survey and based on the Modified Mercalli Intensity Scale of 1931.

EARTHQUAKES IN NORTHERN CALIFORNIA, NEVADA, AND OREGON

Map No.	Date 1963	M	Origin Time (G.C.T.)	Latitude North	Longitude West	h	No. of Stas.	Remarks
1	Oct. 12	3.1	14-18-30.0	36° 50!4	121° 39!7	a	9	SE of Watsonville.
2	Oct. 15	2.6	23-25-51.1	36° 45!5	121° 33!0	d	7	W of Vineyard.
3	Oct. 25	2.6	11-07-47.5	37° 44!2	122° 33!9	a	11	Felt in San Francisco.
4	Oct. 29	4.7	07-01-26.6	40° 41!9	126° 13!9	c	18	Off Cape Mendocino.
5	Nov. 1	3.4	14-05-56.0	35° 33!8	120° 13!9	a	9	E of Atascadero.
6	Nov. 7	3.5	16-39-49.6	40° 24!8	125° 01!1	a	10	Off Cape Mendocino.
7	Nov. 9	2.8	00-05-59.8	36° 47!1	121° 33!4	a	11	Near San Juan Bautista.
7	Nov. 9	2.9	01-31-03.2	36° 47!0	121° 33!3	a	11	Near San Juan Bautista.
8	Nov. 16	4.0	16-48-10.2	38° 00!	117° 06.	c	2	Central Nev. (data from USCGS).
9	Nov. 18	2.9	09-31-48.7	36° 32!6	121° 21!1	d	18	S of Vineyard.
10	Nov. 18	2.7	10-54-45.4	36° 22!5	120° 19!6	a	11	NE of Coalinga.
11	Nov. 19	2.9	03-33-09.2	36° 25!5	121° 02!2	a	10	SW of Llanada.
12	Nov. 20	3.3	05-28-05.5	38° 44!0	119° 45!1	a	15	SE of Lake Tahoe.
13	Nov. 21	3.4	12-43-48.4	37° 05!8	122° 18!3	a	15	Felt in Santa Cruz and Monterey area.
14	Nov. 21	2.6	19-25-43.4	37° 50!5	121° 58!8	c	12	E of Berkeley.
15	Nov. 29	3.2	01-35-53.2	36° 45!6	121° 36!1	b	15	Foreshock of 20-49-36.0.
16	Nov. 29	3.2	08-48-56.0	39° 33!6	117° 55!8	0	9	SW of Dixie Valley, Nev.
15	Nov. 29	3.6	20-49-36.0	36° 47!6	121° 35!8	a	17	SW of San Juan Bautista.
17	Nov. 30	3.3	22-55-51.9	36° 27!6	120° 27!9	d	14	NE of Priest.
18	Dec. 1	2.5	17-01-26.5	36° 35!5	121° 10!6	b	10	W of Llanada.
19	Dec. 4	2.6	06-18-26.6	36° 47!5	121° 32!3	a	11	S of San Juan Bautista.
20	Dec. 6	4.7	08-34-25.7	37° 32!2	118° 25!5	d	17	Felt over 10,000 sq. mi. of east-central California and western Nev. (USCGS).
21	Dec. 6	3.6	10-09-31.4	37° 10!8	118° 20!4	0	15	Aftershock of preceding.

Map No.	Date 1963	M	Origin Time (G.C.T.)	Latitude North	Longitude West	h	No. of Stas.	Remarks
22	Dec. 7	2.7	12-04-11.6	38° 29!9	122° 42!1	a	9	N of Santa Rosa.
23	Dec. 7	3.1	15-17-11.	39° 45!	122° 15!	0	3	Near Orland.
24	Dec. 7	3.3	19-20-15.8	37° 32!8	118° 14!8	a	9	NE of Bishop.
25	Dec. 14	2.6	12-42-44.7	37° 22!1	121° 48!7	a	13	E of San Jose.
26	Dec. 21	4.1	01-38-32.2	40° 18!9	124° 34!9	a	13	Off Cape Mendocino.
-	Dec. 29	3.5	04-02-04.0	39° 06!	114° 12!	d	3	Eastern Nev. (data from USCGS).
27	Dec. 30	3.9	13-47-07.8	38° 53!4	122° 31!2	a	20	Felt over 800 sq. mi. in Clear Lake area.
28	Dec. 30	3.0	16-50-20.7	38° 57!1	122° 42!0	a	9	Aftershock of precedi





PART II. REGISTRATION OF EARTHQUAKES

This section tabulates measured arrival times of prominent phases of earthquakes recorded at selected stations of the seismographic network operated by the University of California (Berkeley). Information regarding the stations and instrumentation will be found in the introductory section of this Bulletin. Earthquakes in the northern California, Nevada, and Oregon region are included in the following tabulation only if of magnitude 4.0 or over, or if of special interest.

Components of ground motion are indicated by N, E, and Z in the "Phase" column. Where no such letter appears, the reading is for the vertical component (Z) alone. The letter "i" (impetus) preceding a phase designates sudden beginning of the motion; "e" (emersio) designates a gradual beginning.

In the column headed "Ground Motion", "c" or "d" indicates initial compression or dilatation of the ground, respectively, from a wave of the compressional type; "+" or "-" indicates initial upward or downward motion of the ground, respectively, from a wave not known to be of the compressional type. N, E, S, or W indicates that the initial horizontal direction of ground motion was toward the north, east, south, or west, respectively.

The maximum amplitude of earth displacement in microns (μ) and periods in seconds (sec) in the indicated phases are given for the Berkeley station in the column headed "Time (GCT)". Total horizontal amplitudes combined from N and E components are designated by "H" (e.g., PH, PPH).

Berkeley (BKS) magnitudes given for teleseisms in the "Remarks" column correspond to the magnitude based on surface waves (M_s). In calculating the published value, body wave amplitudes and periods of body waves are used to determine M_B (body wave magnitude) by:

$$M_B = Q + \log_{10} (A/T),$$

where $A = 1/2$ peak-to-peak ground amplitude in microns,

$T =$ period in seconds .

Q is the empirically determined function of distance and depth given by Gutenberg and Richter ("Magnitude and Energy of Earthquakes", *Annali di Geofisica*, 9:1-15, 1956).

The arithmetic average of the available values of M_B is converted to an equivalent value M_s by:

$$M_s = 1.59 M_B - 3.97.$$

This value is then compared with the value of M_s determined from surface waves of period near 20 seconds.

Frequently quoted sources of information regarding epicenters, origin times, or shock magnitudes are as follows:

- USCGS - U.S. Coast and Geodetic Survey, Washington Science Center, Rockville, Maryland
- BCIS - Bureau Central International de Seismologie, Strasbourg, France
- PAL - Lamont Geological Observatory, Palisades, New York
- PAS - Seismological Laboratory, Pasadena, California
- WMSO - Wichita Mountains Observatory, Oklahoma
- BKS - Byerly Seismographic Station, Berkeley
- BRK - indicates the average magnitude determined by the Berkeley network.

All measurement and interpretation of seismograms (i.e., identification of phases, arrival times, directions of initial ground motion, and ground amplitudes and periods) are done at Berkeley. Readings from the remaining stations in the network other than the six listed (BRK, CLS, MHC, MIN, PRI, REN) are available on request. Requests for additional data or for copies of seismograms should be addressed to the Director.

Date	Sta.	Phase	Time (GCT)	Ground Motion	Remarks
1963					
			h m s		
Oct. 1	BKS	eP	10 38 33.5	c	USCGS: 10.2° N, 84.5°W, O=10 30 31.6 Costa Rica. h about 46 km.
		e(S)NE	45 26	NE	
		e(G)NE	51.5		
		e(R)E	55.4		
	MHC	eP	10 38 28.0	c	
	MIN	eP	43.0	d	
	CLS	eP	38.3	d	
	PRI	eP	17.5	d	
Oct. 2	BKS	eZ	03 44 30.0	d	USCGS: 5.4°S, 152.0°E, O=03 31 27.0 New Britain. h about 65 km.
	MHC	eP	23.5	d	
	MIN	eP	26.5	d	
	CLS	eP	20.6	c	
	PRI	eP	27.7	d	
Oct. 2	BKS	eP	05 58 52.2	d	USCGS: 20.8°S, 174.1°W, O=05 47 05.5 Tonga Islands. h about 33 km. Magnitude 5.7 (BKS).
		e(S)N	06 08 30	SE	
		e(G)N	18.5		
		e(R)NE	22.0		
			mu sec		
		PZ	1.13 6		
		SH	2.04 14		
		MaxH	4.20 16		
	MHC	eP	05 58 52.0	c	
	MIN	eZ	59 03		
	PRI	eP	58 51.5	d	
Oct. 3	MIN	iP	01 14 18.8	c	
Oct. 3	BKS	eN	01 32 30	S	USCGS: 18.3°N, 105.6°W, O=01 22 40.6. Off coast of Colima, Mexico. h about 33 km.
		e(R)N	34.9		
	MHC	eP	27 49.7	c	
	MIN	eZ	28 20		
	PRI	eP	27 36.8	c	
Oct. 3	BKS	iP'	16 07 14.4	d	USCGS: 58.5°S, 25.1°W, O=15 48 17.2 Sandwich Islands, h about 54 km.
		e(PP)	09 16	d	
		e(PPS)N	20 24	Sc	
		e(SS)N	26.2	Sd	
		e(G)N	42.1		
		e(R)	47.6		
			mu sec		
		PZ	0.05 0.8		
		MaxH	1.7 20		
	MHC	eP	07 08.0	c	
	MIN	iZ	18.5	d	
	CLS	eP'	12.9	d	
	PRI	eP'	07.2	c	
Oct. 3	BKS	iP	18 14 51.2	c	USCGS: 58.6°S, 25.5°W, O=17 55 54.2. Sandwich Islands. h about 33 km.
	MHC	eP	14 51.0	d	
	MIN	eP	54.4	c	
	CLS	eP	53.4	d	
	PRI	eP	48.6	d	

Date	Sta.	Phase	Time (GCT)		Ground Motion	Remarks
			h	m s		
1963						
Oct. 3	BKS	eP	23	36 55.2	d	USCGS: 32.2°N, 131.6°E, 0=23 24 34.7.
		eS		46 56	d	Kyushu, Japan. h about 33 km.
		e(SS)		57.5	c	
		e(SSS)		56.3		
		e(R)	00	01.6		
				mu sec		
		PZ	3.33	6		
	MHC	eP	23	36 58.7	d	
	MIN	eZ		48.0	c	
	CLS	eP		50.0	d	
	PRI	eP	37	04.6	d	
Oct. 4	MHC	eP	00	40 24.3	d	USCGS: 32.8°N, 131.4°E, 0=00 27 56.7.
	MIN	eP		09.6	d	Kyushu, Japan. h about 21 km.
	CLS	eP		12.2	d	
	PRI	eP		33.7	d	
Oct. 4	BKS	iP	02	59 18.8	d	USCGS: 20.7°S, 174.0°W, 0=02 47 32.1.
		e(S)NE	03	09 04	NWd	Tonga Islands. h about 33 km.
		e(SS)E		14 20	Wd	Magnitude 6 (BKS).
		e(SSS)E		16 52	W	
		e(G)NE		18.6		
		e(R)NE		21.5		
				mu sec		
		PZ	0.06	1.5		
		SH	1.5	10		
		MaxH	2.7	10		
	MHC	eP	02	59 17.5	c	
	MIN	eP		29.4	c	
	CLS	eP		18.8	d	
	PRI	eP		17.2	c	
Oct. 4	BKS	eP	07	18 00.4	d	USCGS: 49.0°N, 131.9°W, 0=07 14 53.2.
	MHC	eP		09.5	d	Vancouver Island. h about 33 km.
	MIN	eP		17 35.0	c	
	CLS	eP		46.8	d	
	PRI	eP		18 26.5	d	
Oct. 4	BKS	eNE	17	53.9	NEc	USCGS: 30.2°N, 114.3°W, 0=17 49 11.7.
	MIN	eZ		55 32.1	c	Gulf of California. h about 14 km.
	PRI	eP		11.5	c	
Oct. 4	BKS	eP	21	20 20	Wc	USCGS: 30.0°N, 114.3°W, 0=21 15 24.6.
		e(S)NE		23 38	Wc	Gulf of California. h about 14 km.
		e(N)E		24.3	Wc	
	PRI	eP		20 13.2	c	
Oct. 5	BKS	eP	02	06 51.7	c	USCGS: 16.0°N, 173.2°W, 0=01 55 35.2.
		e(S)NE		17.0	SEd	Tonga Islands. h about 79 km.
		e(R)N		27.7		
				mu sec		
		PZ	0.1	1.0		
		MaxH	1.4	20		
	MHC	eP		06 52.3	c	
	MIN	iP		07 02.8	d	
	CLS	eP		06 52.6	c	
	PRI	eP		51.7	c	

Date	Sta.	Phase	Time (GCT)		Ground Motion	Remarks
			h	m s		
1963						
Oct. 5	BKS	iP	05	26 56.7	c	USCGS: 15.9°S, 173.2°W, 0=05 15 32.4.
	MHC	eP		55.8	c	Tonga Islands. h about 33 km.
	MIN	eP		27 06.0	c	
	CLS	eP		55.3	d	
	PRI	eP		55.3	c	
Oct. 5	BKS	eP	07	43 36.0	c	USCGS: 28.8°N, 139.2°E, 0=07 32 19.0.
	MHC	eP		39.4	d	South of Honshu, Japan.
	MIN	iP		32.1	c	h about 454 km.
	CLS	eP		33.0	c	
	PRI	eP		47.0	c	
Oct. 5	BKS	iPN	11	58 29.5	Sc	USCGS: 47.4°N, 128.6°W, 0=11 55 56.7.
		eNE		12 00.7		Off coast of Washington.
	MHC	eP		11 58 38.0	d	h about 33 km.
	MIN	eP		04.5	c	
	CLS	eP		17.2	c	
	PRI	eP		57.5	d	
Oct. 5	BKS	eP	15	30 54	d	
		e(S)NE		41 12	NWc	
		eNE		51.1	SWc	
		e(G)NE		54.0		
		e(R)NE		58.5		
				mu sec		
		MaxH	4.3	50		
Oct. 5	BKS	eP	17	14 40.3	d	USCGS: 16.9°S, 28.9°E, 0=16 54 57.7.
	MHC	eP		40.5	d	Southern Rhodesia. h about 33 km.
	MIN	iP		34.2	c	
	CLS	eP		40.8	c	
	PRI	eP		40.6	d	
Oct. 5	BKS	iP	20	27 53.0	d	USCGS: 52.1°N, 178.1°E, 0=20 20 02.7.
	MHC	eP		58.8	d	Rat Islands. h about 140 km.
	MIN	iZ		43.4	d	
	CLS	eP		47.2	c	
	PRI	eP		28 09.5	c	
Oct. 6	BKS	eP	17	28 06.7	d	USCGS: 33.9°S, 70.0°W, 0=17 15 33.9.
		eZ		28.0	c	Central Chile. h about 101 km.
	MHC	eP		03.5	d	
	MIN	eP		12.4	d	
	CLS	eP		09.8	d	
	PRI	eP		56.0	d	
Oct. 6	MIN	iZ	22	20 50.1	c	
Oct. 7	BKS	eP	04	08 56.0	c	USCGS: 11.6°N, 86.9°W, 0=03 59 54.1.
	MIN	eP		07 43.4	c	Near west coast of Nicaragua.
	CLS	eP		09 18	c	h about 50 km.
	PRI	eP		30	c	
Oct. 7	BKS	eP	05	40 02.5	c	USCGS: 19.8°N, 109.1°W, 0=05 35 16.7.
		eSNE		44 12	SWc	Revilla Gigedo Islands.
		e(R)NE		45.7		h about 33 km.
				mu sec		Magnitude 4.3 (BKS).
		PZ	.67	6		
		SH	1.20	16		

Date	Sta.	Phase	Ground			Motion	Remarks
			Time (GCT)	h	m		
1963							
Oct. 7	MHC	eP	39	55.5		d	
(Cont.)	MIN	eZ	40	21.0		d	
	CLS	eP		10.8		d	
	PRI	eP	39	39.6		c	
Oct. 7	MIN	eZ	11	36	00.2	c	USCGS: 12.1°S, 65.4°E, 0=11 16 06.0. About 1,200 km northeast of Mascarene Island. h about 33 km.
Oct. 7	BKS	eP	12	54	36.0	Sc	USCGS: 12.9°S, 76.8°W, 0=12 43 53.6 Central Peru.
		eZ		55.7			
	MHC	eP		31.8		c	
	MIN	eP		42.7		c	
	CLS	eP		40.0		c	
	PRI	eP		22.5		c	
Oct. 7	BKS	iP	13	25	48.2	NEc	USCGS: 23.6°S, 179.9°E, 0=13 14 24.6. Fiji Islands. h about 550 km.
		ipP		27	49.5	d	
		ePPNE		29	04.5	NEc	Magnitude 5.2 (BKS).
		eSNE		35	16.5	SW	
		iSNE		35	16	NEd	
		esPSNE		38	48	NW	
		ePKKPNE		43.4			
		e(G)NE		47.0			
			mu	sec			
	PZ		2.4	6			
	PPZ		0.18	1.7			
	SH		4	12			
	MHC	eP		25	48.8	c	
	MIN	iP			57.0	c	
	CLS	eP			49.2	c	
	PRI	eP			48.3	c	
Oct. 8	BKS	iP	00	28	19.8	c	USCGS: 15.1°S, 173.2°W, 0=00 17 01.1. Samoa Islands. h about 33 km.
		ePPPE		32	30	Wd	Magnitude 5.6 (BKS).
		iPKIKP		34	16	c	
		eSNE		37	38	SEd	
		iScSNE		38	18	NE	
		eSSNE		41	24	NE	
		e(G)NE		45.3			
		ePKKPNE		46.5			
		e(R)NE		48.5			
			mu	sec			
	PZ		1.71	9			
	SH		1.7	20			
	MaxH		8.9	32			
	MHC	eP			19.3	d	
	MIN	eP			30.6	c	
	CLS	eP			19.5	d	
	PRI	eP			19.0	d	
Oct. 8	MIN	iP	02	14	26.9	c	USCGS: 21.2°S, 177.9°W, 0=02 02 53.4. Fiji Islands. h about 380 km.
Oct. 8	MIN	eP	10	41	44.2	c	USCGS: 29.0°S, 70.3°W, 0=10 28 56.5. Central Chile. h about 71 km.
Oct. 8	MIN	iZ	11	03	25.6	c	USCGS: 76.5°N, 86.5°E, 0=10 53 12. Kara Sea. h about 25 km.

Date	Sta.	Phase	Ground			Motion	Remarks	
			Time (GCT)	h	m			s
1963								
Oct. 9	MIN	eZ	03	26	39.1	c	USCGS: 53.8°N, 170.5°W, 0=03 21 11.1. Bering Sea. h about 250 km.	
Oct. 9	MIN	eP	05	25	29.2	d	USCGS: 18.6°S, 173.7°W, 0=05 13 26.7. Tonga Islands. h about 33 km.	
Oct. 9	BKS	eE	10	50.5				
	MHC	eP		27	38	d		
	MIN	eP			37.7			
	PRI	eP			29.0	c		
Oct. 9	MHC	eP	10	48	39.6	d	USCGS: 20.3°S, 174.4°W, 0=10 36 53.4. Tonga Islands. h about 33 km.	
	MIN	eP			02.3	d		
	CLS	eP			41	c		
	PRI	eP			38.4	d		
Oct. 9	BKS	eE	22	17.8				
		eN		23.8				
Oct. 10	MIN	eP	03	17	11.4	d	USCGS: 47.6°N, 127.1°W, 0=03 15 15. Off coast of Washington. h about 33 km.	
Oct. 10	MIN	eP	08	01	55.1	c		
Oct. 11	BKS	eP	00	12	45.8	d	USCGS: 24.1°S, 179.6°W, 0=00 01 13.0. Fiji Islands. h about 437 km.	
	MHC	eP			47.6	c		
	MIN	eP			55.6	d		
	CLS	eP			47.0	c		
	PRI	eP			46.1	c		
Oct. 11	BKS	eP	10	22	20	c	USCGS: 17.8°N, 105.9°W, 0=10 17 07.6. Off coast of Jalisco, Mexico. h about 33 km.	
		e(S)NE		27	00	SEc		
		e(G)NE		27.9				
		e(R)N		29.1				
	MIN	eZ		22	46.9	c		
	CLS	eP			26.5	d		
	PRI	eP			07.0	c		
Oct. 12	BKS	eP	11	37	28.6	c	USCGS: 44.8°N, 149.0°E, 0=11 26 57.8. Kurile Islands. h about 40 km.	
		ePPN		41	36	Nd	Magnitude 6.7 (BKS).	
		ePPPN		43	28	Sd		
		eSN		46	11	Nc		
		e(SS)NE		49.8		NW		
		e(Q)N		53.4				
		e(R)NE		55.4				
	MHC	eP		37	32.6	d		
		iP'P'		12	06	24	d	
	MIN	eP		11	37	19.9	c	
	PRI	eP			42.5	c		
		iP'P'		12	05	56.5	d	
Oct. 12	MIN	eZ	12	03	03.4	d	USCGS: 46.0°S, 148.8°E, 0=11 53 05. Kurile Islands. h about 33 km.	
Oct. 12	MIN	eP	13	17	28.8	c	USCGS: 44.5°N, 149.4°E. 0=13 07 07.4. Kurile Islands.	
Oct. 12	MIN	eP	14	06	21.4	c	USCGS: 43.5°N, 151.1°E, 0=13 54 50.3. Kurile Islands.	
Oct. 12	MIN	eP	16	22	13.8	d	USCGS: 44.8°N, 144.4°E, 0=16 11 55.0. Kurile Islands.	

Date	Sta.	Phase	Time (GCT)		Ground Motion	Remarks
			h	m s		
1963						
Oct. 12	MIN	eP	18 58	56.0	c	USCGS: 44.7°N, 149.4°E, 0=18 48 35.5. Kurile Islands.
Oct. 13	BKS	ePPE	05 28	27.5	Ec	USCGS: 44.8°N, 149.5°E, 0=05 17 57.1. Kurile Islands. h about 60 km. Magnitude 8.4 (BKS).
		iZ		38.6	c	
		iS		37 00	Ec	
		ePPNE		30 57	Ec	
		ePPP		32 32.2	c	
		eSNE		37.0		
		e(G)NE		44.3		
		eN		45.4		
		e(R)N		47.5		
			mu	sec		
		PZ	22.2	16		
		PPZ	1.4	1.7		
		SH	230	22		
		MaxH	624	11		
	MHC	eP	28	29.4	c	
	MIN	eP		15.2	d	
	CLS	eP		17.3	d	
	PRI	eP		35.3	c	
Oct. 13	BKS	iP	05 40	25.3	Wc	USCGS: 44.8°N, 151.2°E, 0=05 30 04.6. Kurile Islands. h about 40 km.
		iZ		43.2	c	
	MHC	eP		30.0	c	
	MIN	iP		17.5	c	
	CLS	eP		20.8	c	
Oct. 13	BKS	eP	05 51	20.0	c	USCGS: 46.5°N, 151.6°E, 0=05 42 14.2. Kurile Islands. h about 55 km.
	MHC	eP		25.0	c	
	MIN	iP		12.8	d	
	CLS	eP		15.8	d	
	PRI	eP		30.5	c	
Oct. 13	BKS	iP	05 52	27.0	c	
	MHC	eP		31.5	c	
	MIN	eP		13.4	c	
	CLS	eP		22.1	c	
	PRI	eP		40.9	c	
Oct. 13	MHC	eP	06 15	47.7	c	USCGS: 45.9°N, 151.9°E, 0=06 05 29.5. Kurile Islands. h about 55 km.
	MIN	eZ		14 34.6	c	
	CLS	eP		15 38.5	c	
	PRI	eP		57.5	c	
Oct. 13	MHC	eP	06 19	21.5	c	USCGS: 45.3°N, 151.3°E, 0=06 09 02.2. Kurile Islands. h about 60 km.
	MIN	iZ		07.8	d	
	CLS	eP		12.9	d	
	PRI	eP		33.1	c	
Oct. 13	MHC	eP	06 58	48	d	USCGS: 45.3°N, 147.5°E, 0=06 46 54.4. Kurile Islands. h about 55 km.
	MIN	iP		35.0	c	
	CLS	eP		36.8	d	
	PRI	eP		55	c	

Date	Sta.	Phase	Time (GCT)		Ground Motion	Remarks
			h	m s		
1963						
Oct. 13	MHC	eP	07 13	49.5	c	USCGS: 45.5°N, 150.6°E, 0=07 03 23.8. Kurile Islands. h about 50 km.
	MIN	iZ		35.4	d	
	CLS	eP		38.8	c	
	PRI	eP		58.5	d	
Oct. 13	MIN	iP	08 21	42.6	c	USCGS: 44.5°N, 151.6°E, 0=08 11 32.0. Kurile Islands. h about 60 km.
Oct. 13	MIN	eP	09 26	45.9	d	USCGS: 44.6°N, 149.6°E, 0=09 16 25.9. Kurile Islands. h about 50 km.
	CLS	eP		27 02.9	c	
	PRI	eP		13.3	d	
Oct. 13	BKS	ePNE	12 52	45.5	Wc	USCGS: 44.4°N, 149.4°E, 0=12 42 13.0. Kurile Islands. h about 55 km.
	MIN	eP		37.7	c	
	CLS	eP		40.6	c	
	PRI	eP		59.2	c	
Oct. 13	BKS	iP	13 08	46.0	d	USCGS: 45.0°N, 150.1°E, 0=12 58 21.6. Kurile Islands. h about 50 km.
	MHC	eP		50.7	d	
	MIN	iZ		37.8	d	
	CLS	eP		41.5	d	
	PRI	eP		59.7	d	
Oct. 13	MIN	iP	14 04	35.6	c	USCGS: 44.9°N, 151.7°E, 0=13 54 24.8. Kurile Islands. h about 50 km.
Oct. 13	MIN	iP	14 36	32.1	c	USCGS: 44.5°N, 149.5°E, 0=14 26 11.9. Kurile Islands. h about 50 km.
Oct. 13	BKS	eP	16 10	15.0	c	USCGS: 45.6°N, 150.5°E, 0=15 59 52.9. Kurile Islands. h about 35 km. Magnitude 5.9 (BKS).
		eSNE		18 42	SE	
		eSSE		22 36	E	
		eQNE		25.7		
		e(R)NE		28.3		
			mu	sec		
		PZ	0.14	1.2		
		SH	3.92	16		
		MaxH	12	42		
	MHC	eP		19.7	c	
	MIN	iP		07.3	c	
	CLS	eP		10.2	c	
	PRI	eP		28.8	c	
Oct. 13	BKS	eP	16 39	19	c	USCGS: 44.9°N, 150.3°E, 0=16 28 58.2. Kurile Islands. h about 40 km.
		eN		55.4		
		e(R)NE		57.1		
	MHC			39 19	c	
	MIN			16.5	d	
	CLS			18.0	d	
	PRI			13.0	d	
Oct. 13	BKS	eP	16 50	44.8	d	USCGS: 18.4°N, 103.1°W, 0=16 45 18.8. Near coast of Michoacan, Mexico. h about 50 km.
	MHC	eP		50 38.0	c	
	MIN	eP		57.0	c	
	CLS	eP		51.0	d	
	PRI	eP		25.0	c	
Oct. 13	MIN	iP	16 59	59.3	c	USCGS: 44.5°N, 150.4°E, 0=16 49 41.2. Kurile Islands. h about 40 km.

Date	Sta.	Phase	Ground		Remarks	
			Time (GCT)	Motion		
1963			h	m	s	
Oct. 13	BKS	eP	17 36	28	c	USCGS: 44.5°N, 150.8°E, 0=17 25 55.4. Kurile Islands. h about 45 km.
	MHC	eP		33.5	d	
	MIN	eP		11.3	c	
	CLS	eP		14.5	d	
	PRI	eP		35.3	d	
Oct. 13	MIN	iP	18 25	11.1	c	USCGS: 44.2°N, 149.4°E, 0=18 13 44.6. Kurile Islands. h about 55 km.
	CLS	eP		16.5	d	
	PRI	eP		43.0	d	
Oct. 13	BKS	eP	19 37	53.7	c	USCGS: 45.7°N, 151.5°E, 0=19 26 04.2. Kurile Islands. h about 30 km.
	MHC	eP		37 58.0	c	
	MIN	iP		46.5	d	
	CLS	eP		49.2	c	
	PRI	eP		38 07.7	c	
Oct. 13	BKS	iP	22 05	17.2	d	USCGS: 44.7°N, 152.1°E, 0=21 55 00.8. Kurile Islands. h about 50 km.
	MHC	eP		21.9	d	
	MIN	iP		09.3	d	
	CLS	eP		12.7	d	
	PRI	eP		31.1	d	
Oct. 13	BKS	eP	00 02	48.0	d	USCGS: 44.5°N, 150.1°E, 0=23 52 22.8. Kurile Islands. h about 50 km.
		eSNE		11 20	NW	
		eNE		12 20	NW	
		e(G)NE		18.6		
		e(R)		21.5		
			mu	sec		
		PZ	0.057	1.5		
		SH	2.04	16		
		MaxH	4.8	11		
	MHC	eP	02	53.0	d	
	MIN	eP		40.8	d	
	CLS	eP		43.8	d	
	PRI	eP		01.0	c	
Oct. 13	BKS	eZ	01 02	39	d	USCGS: 46.6°N, 150.6°E, 0=00 52 04.0. Kurile Islands. h about 35 km.
	MIN	eZ		09.1	d	
Oct. 14	BKS	iP	04 16	25.8	d	USCGS: 44.9°N, 150.6°E, 0=04 06 01.7. Kurile Islands. h about 50 km.
	MHC	eP		30.7	d	
	MIN	eP		17.9	c	
	CLS	eP		22.0	c	
	PRI	eP		38.1	c	
Oct. 14	MHC	eP	04 22	31.0	d	USCGS: 44.9°N, 150.7°E, 0=04 13 03.1. Kurile Islands. h about 40 km.
	MIN	iP		18.6	c	
	CLS	eP		21.3	c	
	PRI	eP		41.4	c	
	PRI	eP		41.4	c	
Oct. 14	BKS	eP	04 21	37.5	d	USCGS: 44.7°N, 150.6°E, 0=04 11 14.0. Kurile Islands. h about 45 km.
	MHC	eP		42.5	d	
	MIN	eP		29.6	c	
	CLS	eP		32.6	c	
	PRI	eP		50.7	c	

Date	Sta.	Phase	Ground		Remarks	
			Time (GCT)	Motion		
1963			h.	m.	s.	
Oct. 14	BKS	iP	05 34	33.7	c	USCGS: 44.5°N, 151.0°E, 0=05 24 12.3. Kurile Islands. h about 55 km.
	MIN	eP		25.8	d	
	CLS	eP		28.4	c	
	PRI	eP		48.2	c	
Oct. 14	BKS	iP	05 49	06.0	d	USCGS: 2.3°S, 77.6°W, 0=05 39 17.1. Peru-Ecuador border. h about 33 km.
	MHC	eP		00.6	c	
	MIN	eZ		12.0	d	
	CLS	eP		09.0	d	
	PRI	eP		48 51.5	d	
Oct. 14	BKS	iP	06 32	51.4	c	
	MHC	eP		57.6	c	
	MIN	iP		31.8	c	
	CLS	eP		44.7	d	
	PRI	eP		09.2	d	
Oct. 14	BKS	eP	07 12	08.0	c	USCGS: 18.8°S, 169.3°E, 0=06 59 56.6. New Hebrides Islands. h about 250 km.
	MHC	eP		09.1	c	
	MIN	iP		15.8	d	
	CLS	eP		07.8	c	
	PRI	eP		10.0	c	
Oct. 14	MIN	eZ	07 26	16.0	c	USCGS: 44.6°N, 150.3°E, 0=07 15 58.0. Kurile Islands. h about 45 km.
Oct. 14	BKS	eP	08 04	53.4	d	USCGS: 44.8°N, 151.2°E, 0=07 54 33.9. Kurile Islands. h about 55 km.
	MHC	eP		04 58.0	d	
	MIN	iP		52.5	d	
	CLS	eP		49.0	d	
	PRI	eP		05 07.3	d	
Oct. 14	BKS	ePNE	13 32	04.0	NWd	USCGS: 44.8°N, 151.0°E, 0=13 21 45.2. Kurile Islands. h about 60 km. Magnitude 5.9 (BKS).
		ePP		34 18	d	
		iSNE		40 36	NEd	
		eSSNE		44 44	SW	
		e(Q)N		47.5		
		e(G)NE		48.0		
		e(R)E		49.7		
			mu	sec		
		PZ	1.82	10		
		SH	4.1	20		
		MaxH	4.1	20		
	MHC	iP		09.5	d	
	MIN	iP		57.3	d	
	CLS	eP		00.1	d	
	PRI	eP		18.5	d	
Oct. 14	BKS	iZ	21 17	05.1	c	USCGS: 45.0°N, 150.5°E, 0=21 08 00.1. Kurile Islands. h about 45 km.
Oct. 14	MIN	iP	22 46	01.8	d	USCGS: 44.5°N, 150.6°E, 0=22 35 31.7. Kurile Islands. h about 45 km.
Oct. 15	MIN	iP	07 30	52.2	c	USCGS: 60.1°N, 134.7°W, 0=07 26 10.8. Yukon. h about 33 km.

Date	Sta.	Phase	Ground		Remarks	
			Time (GCT)	Motion		
1963			h	m	s	
Oct. 15	MHC	eP	07 18	45.2	d	USCGS: 20.5°S, 173.9°W, 0=07 06 59.9
	MIN	eZ		56.4	c	Tonga Islands. h about 33 km.
	CLS	eP		43.8	c	
	PRI	eP		44.9	c	
Oct. 15	MIN	iP	07 32	05.0	c	USCGS: 59.0°N, 136.8°W, 0=07 26 09.4
						Southern Alaska. h about 33 km.
Oct. 15	MIN	iP	08 10	25.4	c	USCGS: 45.0°N, 151.1°E, 0=08 00 11.5
						Kurile Islands. h about 40 km.
Oct. 15	MIN	iZ	09 12	24.7	d	USCGS: 45.3°N, 150.2°E, 0=09 02 08.3
						Kurile Islands. h about 40 km.
Oct. 15	BKS	iP	09 42	33.0	c	USCGS: 42.2°N, 150.2°E, 0=09 32 08.7
	MHC	eP		37.7	c	Kurile Islands. h about 40 km.
	MIN	iP		25.4	d	
	CLS	eP		28.0	d	
	PRI	eP		46.9	c	
Oct. 15	MHC	eP	10 09	43.7	d	USCGS: 67.2°N, 18.4°W, 0=09 59 30.1
	MIN	iP		23.6	c	North of Iceland. h about 33 km.
	CLS	eP		37.7	d	
	PRI	eP		49.1	d	
Oct. 15	BKS	eP	10 57	41.5	d	USCGS: 44.6°N, 149.0°E, 0=10 47 12.6
	MHC	eP		45	c	Kurile Islands. h about 50 km.
	MIN	iP		34.9	c	
	CLS	eP		37.5	c	
	PRI	eP		55.5	d	
Oct. 15	MIN	iP	12 04	31.4	c	USCGS: 45.1°N, 151.9°E, 0=11 53 45.5
						Kurile Islands. h about 33 km.
Oct. 16	MIN	iP	05 25	54.0	c	USCGS: 44.8°N, 150.4°E, 0=05 15 36.1
						Kurile Islands. h about 33 km.
Oct. 16	MIN	iP	08 43	30.3	c	USCGS: 45.6°N, 151.9°E, 0=08 33 42.0
						Kurile Islands. h about 45 km.
Oct. 16	MIN	eP	10 41	19.0	d	USCGS: 45.2°N, 150.4°E, 0=10 30 55.2
						Kurile Islands. h about 45 km.
Oct. 16	MHC	eP	14 06	46.2	c	USCGS: 15.1°S, 173.6°W, 0=13 56 26.2
	MIN	iP		56.0	d	Tonga Islands. h about 33 km.
	CLS	eP		46.9	c	
	PRI	eP		45.3	d	
Oct. 16	MIN	iP	15 38	13.7	c	
Oct. 17	MIN	iP	03 18	31.3	d	USCGS: 11.6°N, 140.6°E, 0=03 05 50.2
						Mariana Islands. h about 70 km.
Oct. 17	MIN	eP	10 27	06.8	d	USCGS: 43.8°N, 151.0°E, 0=10 16 48.9
						Kurile Islands. h about 50 km.
Oct. 17	BKS	iP	23 35	07.7	c	USCGS: 44.6°N, 149.4°E, 0=23 24 34.4
	eP			08	c	Kurile Islands. h about 45 km.
	iSNE			43 40	NE	
	eSSE			47 56	Wc	
	e(G)NE			50.9		
	e(R)E			53.7		

Date	Sta.	Phase	Ground		Remarks	
			Time (GCT)	Motion		
1963			h	m	s	
Oct. 17			mu	sec		
(Cont.)		PZ	2.34	6		
		SH	6	26		
		MaxH	12.4	44		
	MHC	eP		09.7	d	
	MIN	eP		57.2	c	
	CLS	eP		00.6	d	
	PRI	eP		19.4	c	
Oct. 18	MIN	eP	04 11	37.0	c	USCGS: 44.5°N, 150.4°E, 0=04 01 21.7
						Kurile Islands. h about 60 km.
Oct. 18	MIN	eP	08 11	00.0	c	USCGS: 62.6°N, 146.6°W, 0=08 05 22.1
						Central Alaska. h about 51 km.
Oct. 18	BKS	iP	08 54	15.5	c	USCGS: 10.5°S, 161.6°E, 0=08 41 38.0
	MHC	eP		17	d	Solomon Islands. h about 33 km.
	CLS	eP		03.9	c	
	PRI	eP		19.3	d	
Oct. 18	MIN	iP	09 03	51.1	d	USCGS: 44.8°N, 150.2°E, 0=08 53 33.9
						Kurile Islands. h about 60 km.
Oct. 18	MIN	iP	18 05	13.7	d	USCGS: 45.6°N, 150.6°E, 0=17 55 00.2
						Kurile Islands. h about 40 km.
Oct. 18	BKS	iP	20 15	26.5	c	USCGS: 47.6°N, 154.3°E, 0=20 05 14.4
	MHC	eP		23	d	Kurile Islands. h about 40 km.
	MIN	eP		05.5	c	
	CLS	eP		10	d	
	PRI	eP		37.2	d	
Oct. 19	BKS	eP	02 28	47.3	c	USCGS: 46.8°N, 153.7°E, 0=02 18 37.9
	eS			54	NE	Kurile Islands. h about 45 km.
	e(G)			43.8		
	e(R)			45.7		
			mu	sec		
	SH		2.9	24		
	MaxH		3.7	30		
	MHC	eP		28 52	c	
	MIN	eP		33.4	c	
	CLS	eP		48	d	
	PRI	eP		29 04.2	d	
Oct. 19	MIN	iP	03 24	59.1	c	USCGS: 46.5°N, 153.9°E, 0=03 15 02.5
						Kurile Islands. h about 40 km.
Oct. 19	BKS	iP	03 44	27.7	c	USCGS: 46.6°W, 153.8°E, 0=03 34 19.6
	eSNE			52 36	NEd	Kurile Islands. h about 33 km.
	e(G)NE			59.2		
	eZ			04 01.8		
	e(R)			02.6		
			mu	sec		
	SH		3.7	20		
	MaxH		6.2	28		
	MHC	eP		33.9	c	
	MIN	iP		19.2	d	
	CLS	eP		22	c	
	PRI	eP		31	c	

Date	Sta.	Phase	Ground		Remarks	
			Time (GCT)	Motion		
1963			h	m	s	
Oct. 19	BKS	eP	03 57	25.5	c	USCGS: 46.8°N, 153.8°E, 0=03 47 07.7. Kurile Islands. h about 25 km.
	MIN	iP		09.1	c	
	CLS	eP		08.2	c	
	PRI	eP		26	c	
Oct. 19	MIN	eP	07 05	08.0	c	USCGS: 58.7°N, 137.4°W, 0=07 00 24.8. Southeastern Alaska. h about 34 km.
Oct. 19	MIN	iP	11 25	12.1	d	USCGS: 62.4°N, 149.6°W, 0=11 19 31.8. Central Alaska. h about 96 km.
Oct. 19	BKS	eP	16 25	35.5	d	USCGS: 44.4°N, 150.9°E, 0=16 15 21.4. Kurile Islands. h about 120 km.
	MHC	eP		40.9	c	
	MIN	iP		28.0	c	
	CLS	eP		31.4	d	
	PRI	eP		49.6	d	
Oct. 20	BKS	eP	01 03	35.0	c	USCGS: 44.7°N, 150.7°E, 0=00 53 07.2. Kurile Islands. h about 25 km. Magnitude 6 3/4 - 7 (BKS).
	iZ			57.2	d	
	MHC	eP		39.5	c	
	MIN	iP		33.3	d	
	CLS	eP		30.9	d	
Oct. 20	BKS	eP	01 07	28.0	c	
	MHC	eP		33.2	c	
	MIN	iP	08	21.7	d	
	CLS	eP		23.9	c	
	PRI	eP		42.7	d	
Oct. 20	MIN	eZ	01 17	41.2	c	USCGS: 47.4°N, 151.1°E, 0=01 07 35.0. Kurile Islands. h about 45 km.
	CLS	eP		15.5	d	
	PRI	eP	18	08.6	d	
Oct. 20	MIN	iP	01 24	23.2	c	USCGS: 44.6°N, 150.1°E, 0=01 14 05.2. Kurile Islands. h about 45 km.
Oct. 20	BKS	iP	03 11	14.5	c	
	MHC	eP		15.4	d	
	MIN	iP		24.5	c	
	CLS	eP		13.6	d	
	PRI	eP		15.4	c	
Oct. 20	MIN	iP	02 19	57.1	c	USCGS: 44.7°N, 150.0°E, 0=02 09 29.4. Kurile Islands. h about 45 km.
Oct. 20	MIN	iP	02 16	47.5	c	
Oct. 20	MIN	eP	04 50	24.6	d	USCGS: 44.9°N, 150.3°E, 0=04 40 09.1. Kurile Islands. h about 50 km.
Oct. 20	BKS	eP	06 20	50.0	c	USCGS: 43.9°N, 150.7°E, 0=06 10 25.0. Kurile Islands. h about 50 km.
	MHC	eP		53.9	c	
	MIN	iP		42.5	d	
	CLS	eP		45.1	d	
	PRI	eP	21	03.4	d	
Oct. 20	MIN	eP	06 49	08.5	d	USCGS: 44.4°N, 150.3°E, 0=06 38 51.0. Kurile Islands. h about 50 km.
Oct. 20	MIN	eP	08 36	34.0	c	USCGS: 44.3°N, 149.4°E, 0=08 26 12.3. Kurile Islands. h about 33 km.

Date	Sta.	Phase	Ground		Remarks	
			Time (GCT)	Motion		
1963			h	m	s	
Oct. 20	BKS	eP	09 21	11.2	d	USCGS: 44.4°N, 150.0°E, 0=09 10 43.9. Kurile Islands. h about 40 km. Magnitude 6 - 6 1/2 (BKS).
		eSNE		29 50	NW	
		e(G)NE		37.3		
		e(R)		40.3		
			mu	sec		
		PZ		0.043	1	
		SH		2.38	12	
		MaxH		4.0	34	
	MHC	eP		15.4	d	
	MIN	iP		03.5	d	
		e(PP)	23	48.0	d	
	CLS	eP	21	06.6	d	
	PRI	eP		24.7	d	
Oct. 20	BKS	eP	12 02	49.0	c	USCGS: 44.7°N, 150.2°E, 0=11 52 20.7. Kurile Islands. h about 45 km.
		eSNE		11 16	NEd	
		e(G)NE		18.7		
		e(R)E		21.5		
			mu	sec		
		PZ		0.037	1.2	
		SH		4.0	16	
		MaxH		4.9	40	
	MHC	eP		46.9	c	
	MIN	eP		38.3	c	
	CLS	eP		41.7	d	
	PRI	eP		03.0	c	
Oct. 20	MIN	eP	13 31	28.6	c	USCGS: 45.1°N, 150.5°E, 0=13 21 14.1. Kurile Islands. h about 45 km.
Oct. 20	BKS	iP	13 31	37.3	c	USCGS: 31.1°N, 115.6°W, 0=13 29 26.6. Baja California, h about 45 km. Magnitude 5 (BKS).
		eS		33 45.5		
	MHC	eP		31.2	c	
	MIN	iP		32 10.3	d	
		e(S)		33 54.4		
	PRI	eP		31 06.0	c	
Oct. 20	MIN	eZ	17 52	02.7	c	USCGS: 44.2°N, 149.6°E, 0=17 41 27.3. Kurile Islands. h about 45 km.
Oct. 20	BKS	eP	18 09	26.5	c	USCGS: 44.2°N, 149.6°E, 0=17 58 58.7. Kurile Islands. h about 45 km.
	MIN	eP		19.3	d	
	CLS	eP		21.9	d	
	PRI	eP		40.6	c	
Oct. 21	BKS	eZ	09 30	58	c	USCGS: 44.7°N, 150.3°E, 0=09 40 14.6. Kurile Islands. h about 55 km.
	MHC	eP		53.3	c	
	MIN	eZ		31 02.5	d	
	CLS	eP		00.0	d	
	PRI	eP		30 50.8	d	
Oct. 21	MIN	eP	10 18	07.6	c	USCGS: 45.0°N, 150.3°E, 0=10 07 52.9. Kurile Islands. h about 55 km.
Oct. 21	BKS	eP	15 48	47.2	c	USCGS: 45.5°N, 149.7°E, 0=15 38 24.3. Kurile Islands. h about 55 km.
	MHC	eP		48 52.1	c	

Date	Sta.	Phase	Ground		Remarks		
			Time (GCT)	Motion			
			h	m	s		
1963							
Oct. 21	MIN	iP	39.7	c			
(Cont.)	CLS	eP	42.7	c			
	PRI	eP	49 01.0	c			
Oct. 21	BKS	iP	23 29 07.6	c	USCGS: 44.0°N, 150.3°E, O=23 18 41.3.		
	MHC	eP	11.8	d	Kurile Islands. h about 50 km.		
	MIN	iP	00.1	d			
	CLS	eP	03	c			
	PRI	eP	20.4	d			
Oct. 21	BKS	iP	23 39 47.7	c	USCGS: 44.0°N, 150.1°E, O=23 29 20.7.		
	MHC	eP	51.7	c	Kurile Islands. h about 55 km.		
	MIN	iP	40.5	d			
	CLS	eP	42.6	c			
	PRI	eP	40 00.8	c			
Oct. 22	BKS	eP	03 27 38.5	c	USCGS: 45.0°N, 150.2°E, O=03 17 15.2.		
	MHC	eP	30.5	c	Kurile Islands. h about 45 km.		
	MIN	iP	31.6	d			
	CLS	eP	31.2	c			
	PRI	eP	52.5	c			
Oct. 22	BKS	iP	03 36 06.0	c	USCGS: 43.9°N, 150.3°E, O=03 25 38.8.		
	MHC	eP	10.5	c	Kurile Islands. h about 50 km.		
	MIN	eZ	10.0	c			
	CLS	eP	02.6	c			
	PRI	eP	15.3	c			
Oct. 22	MIN	eP	04 36 56.8	c	USCGS: 51.0°N, 179.4°E, O=04 29 11.7.		
		ipP	37 09.3	d	Rat Islands. h about 55 km.		
Oct. 22	MIN	iP	10 28 33.3	c	USCGS: 44.2°N, 150.3°E, O=10 18 14.5.		
					Kurile Islands. h about 50 km.		
Oct. 22	BKS	iP	15 48 00.0	c	USCGS: 11.6°S, 166.3°E, O=15 35 26.1.		
	MHC	eP	01.2	d	Santa Cruz Islands. h about 80 km.		
	MIN	eZ	06.6	c			
	CLS	eP	47 59.3	d			
	PRI	eP	48 02.7	c			
Oct. 23	BKS	iP	00 16 28.8	d	USCGS: 45.7°N, 151.6°E, O=00 06 09.0.		
	MHC	eP	33.4	d	Kurile Islands. h about 20 km.		
	MIN	iP	20.6	c			
	CLS	eP	24.0	d			
	PRI	eP	42.7	d			
Oct. 23	BKS	eP	08 08 56.0	d	USCGS: 12.0°S, 166.5°E, O=07 56 12.3.		
	MHC	eZ	55.8	d	Santa Cruz Islands. h about 107 km.		
	MIN	eZ	09 02.5	c			
	CLS	eP	08 42.1	d			
	PRI	eP	08 58	d			
Oct. 23	BKS	iP	09 58 07.8	d	USCGS: 41.2°N, 144.2°E, O=09 47 08.1.		
	MHC	eP	12.0	d	East of Honshu, Japan.		
	MIN	iP	01.0	d	h about 50 km.		
		ipP	13.9	d			
	CLS	eP	03.5	d			
	PRI	eP	20.7	d			

Date	Sta.	Phase	Ground		Remarks		
			Time (GCT)	Motion			
			h	m	s		
1963							
Oct. 23	BKS	iP	20 30 55.0	d	USCGS: 19.4°N, 155.5°W, O=20 24 05.5		
		eZ	31 04.7	c	Hawaiian Islands. h about 5 km.		
	MHC	eP	30 56.9	c			
	MIN	iP	31 08.3	c			
	CLS	eP	30 55.2	d			
	PRI	eP	59.7	c			
Oct. 24	BKS	eZ	01 16 57	d	USCGS: 44.5°N, 150.3°E, O=01 06 25.9.		
	MHC	eP	52	c	Kurile Islands. h about 45 km.		
	MIN	eP	57.9	c			
	CLS	eP	53.3	c			
	PRI	eP	53.7	d			
Oct. 24	BKS	eZ	06 53 27.3	c	USCGS: 4.3°N, 78.4°W, O=06 44 18.5.		
	MHC	eP	13.5	c	Near west coast of Colombia.		
	MIN	eP	33.0	c	h about 38 km.		
	CLS	eP	24.3	c			
	PRI	eP	13.0	d			
Oct. 24	BKS	iP	07 45 27.1	c	USCGS: 4.9°S, 102.9°E, O=07 26 23.9.		
	MHC	eP	07 45 19.0	d	Off south coast of Sumatra.		
	MIN	eP	24.1	d	h about 50 km.		
	CLS	eP	15.3	d			
	PRI	eP	21.3	d			
Oct. 24	BKS	iP	19 31 52.5	c	USCGS: 28.3°N, 128.5°E, O=19 19 10.2.		
	MHC	eP	55	c	Ryukyu Islands. h about 33 km.		
	MIN	eP	48.4	c			
	CLS	eP	46.5	c			
	PRI	eP	53.7	c			
Oct. 24	BKS	eP	20 28 53	c	USCGS: 44.4°N, 149.7°E, O=20 18 12.7.		
	MHC	eP	45.5	c	Kurile Islands. h about 41 km.		
	CLS	eP	54	d			
	PRI	eP	54.5	d			
Oct. 25	MIN	eP	06 10 09.1	c	USCGS: 52.0°N, 174.8°E, O=06 02 06.6.		
					Near Aleutian Islands.		
					h about 70 km.		
Oct. 25	MIN	iP	10 28 13.5	c	USCGS: 45.3°N, 150.2°E, O=10 17 57.1.		
					Kurile Islands. h about 40 km.		
Oct. 25	MIN	eP	15 07 21.1	c	USCGS: 35.4°N, 116.9°W, O=15 05 22.3.		
	MHC	eP	06 29.6	d	San Bernardino County, California.		
	CLS	eP	46.7	d	h about 14 km.		
	PRI	eP	13.0	c	Magnitude 4.5 (USCGS).		
Oct. 25	BKS	iP	20 11 35.2	c	USCGS: 12.3°N, 144.5°E, O=19 58 58.3.		
	MHC	eP	37.3	c	Mariana Islands. h about 29 km.		
	MIN	iP	35.1	d			
		ipP	46.0	d			
	CLS	eP	34.1	c			
	PRI	eP	42.3	c			
Oct. 26	BKS	iZ	04 06 21.6	d	USCGS: 44.5°N, 150.1°E, O=03 55 39.7.		
	MHC	eP	11.6	d	Kurile Islands. h about 55 km.		
	MIN	iP	05 58.9	c			

Date	Sta.	Phase	Ground		Remarks
			Time (GCT)	Motion	
1963			h	m	s
Oct. 26		ipP	06	13.5	c
(Cont.)	CLS	eP		02.5	d
	PRI	eP		20.5	d
Oct. 26	MIN	eP	05 11	51.9	d
					USCGS: 43.7°N, 150.5°E, 0=05 01 31.5. Kurile Islands. h about 40 km.
Oct. 26	BKS	iP	06 10	10.0	c
	MHC	eP		14.5	c
	MIN	iP		02.9	c
		ipP		18.2	c
	CLS	eP		05.4	c
	PRI	eP		29.5	c
Oct. 26	MIN	iP	06 38	27.3	c
					USCGS: 44.5°N, 149.8°E, 0=05 59 44.2. Kurile Islands, h about 60 km.
Oct. 26	MIN	eP	07 32	09.5	d
					USCGS: 51.2°N, 177.5°W, 0=07 24 28.7. Andreanof Islands. h about 33 km.
Oct. 26	BKS	eP	11 32	13.3	d
	MHC	eP		05	d
	MIN	iP		05.5	c
		ipP		10.5	c
	CLS	eP		58.1	c
	PRI	eP		13.8	d
Oct. 26	MIN	eP	11 42	11.6	c
					USCGS: 44.6°N, 149.8°E, 0=11 31 53.0. Kurile Islands. h about 55 km.
Oct. 26	BKS	eP	12 45	05.0	d
	MHC	eP		05.5	c
	MIN	iP		15.1	d
	CLS	eP		06.1	d
	PRI	eP		05.0	d
Oct. 26	MIN	iP	20 22	47.6	c
					USCGS: 43.1°N, 111.2°W, 0=20 20 14.6. Southeastern Idaho. h about 35 km.
Oct. 26	MIN	iP	22 54	26.0	c
					USCGS: 5.2°S, 152.0°E, 0=22 41 29.8. New Britain. h about 73 km.
Oct. 26	MIN	iP	00 09	16.2	d
					USCGS: 43.8°N, 151.2°E, 0=23 58 57.8. Kurile Islands. h about 33 km.
Oct. 27	BKS	iP	08 56	36.5	c
	MHC	eP		37.2	c
	MIN	iP		46.3	d
	CLS	eP		37.2	c
	PRI	eP		37.3	c
Oct. 27	MIN	eP	10 50	52.4	c
					USCGS: 28.8°S, 175.2°W, 0=10 38 49. Tonga Islands. h about 35 km.
Oct. 27	MIN	eP	13 32	51.9	c
Oct. 27	MHC	eZ	14 52	15.5	c
	MIN	eZ		05.7	d
	PRI	eP		51 51.7	d
		e(s)		53 11.5	c
					USCGS: 33.1°N, 115.6°W, 0=14 50 19.7. Imperial County, California. h about 14 km.

Date	Sta.	Phase	Ground		Remarks
			Time (GCT)	Motion	
1963			h	m	s
Oct. 27	MHC	eP	14 58	34	d
		e(s)	15 00	13.9	d
	MIN	iZ		01 01.7	c
		i(s)		02 52.6	c
	PRI	eP	14 58	28.4	c
		e(s)		59 41.5	c
Oct. 27	MHC	eP	18 09	22.1	c
	MIN	eZ		10 32.5	d
	PRI	eP		09 06.0	c
		e(s)		10 23.0	d
Oct. 27	BKS	eZ	18 14	43.5	d
	MHC	eP		15 48.4	d
	MIN	eP		32.3	d
		i(s)		17 25.1	c
	CLS	eZ		14 44.1	c
	PRI	eP		07.1	c
		e(s)		15 43.3	d
Oct. 27	BKS	iP	18 36	50.8	d
	MHC	eP		36 50.7	c
	MIN	eP		37 00.7	d
	CLS	eP		36 51.5	c
	PRI	eP		50.0	d
Oct. 27	MIN	eP	18 52	05.9	c
					USCGS: 33.0°N, 115.6°W, 0=18 49 36.3. Imperial County, California. h about 14 km.
Oct. 27	MIN	eP	19 48	05.2	d
					USCGS: 16.8°S, 173.5°W, 0=19 36 26.6. Tonga Islands. h about 33 km.
Oct. 27	BKS	iP	20 16	04.0	c
	MHC	eP		08.8	c
	MIN	eP		15 55.6	d
		ipP		16 12.1	c
	CLS	eP		15 58.0	c
	PRI	eP		16 15.5	c
Oct. 28	BKS	eP	08 07	20.5	d
		eZ		31.3	d
		e(PcP)		42.4	c
		e(S)NE		17 16	NW
		e(G)NE		27.9	c
		e(R)NE		31.4	c
			mu	sec	
		PZ	0.21	1.2	
		SH	1.87	18	
		MaxH	2.3	16	
	MHC	eP		21.6	d
	MIN	iP		30.0	d
	CLS	eP		21.5	d
	PRI	eP		19.0	c
Oct. 28	MIN	eP	08 16	48.0	c
		e(s)		18 44.1	c
					USCGS: 33.0°N, 115.6°W, 0=08 14 15.6. Imperial County, California. h about 14 km.

Date	Sta.	Phase	Time (GCT)			Ground Motion	Remarks
			h	m	s		
1963							
Oct. 28	MIN	eP e(S)	08 16	48.0	c	USCGS: 33.0°N, 115.6°W, 0=08 14 15.6. Imperial County, California. h about 14 km.	
Oct. 28	BKS	iP iPcP e(S)NE e(G)NE e(R)N	12 12	42.8 46.7 20 20 26.0 28.5	c c SWd	USCGS: 52.8°N, 159.8°E, 0=12 03 19.8. Off east coast of Kamchatka. h about 33 km. Magnitude 5.1 (BKS).	
			mu	sec			
		PZ	0.26	1.4			
		SH	1.3	20			
		MaxH	2.4	28			
	MHC	eP		48.2	c		
	MIN	iP		32.8	c		
	CLS	eP		37.7	c		
	PRI	eP		58.6	c		
Oct. 28	BKS	iP	19 28	20.5	d	USCGS: 42.8°S, 73.7°W, 0=19 15 12.5. Southern Chile. h about 30 km.	
Oct. 28	BKS	iP eZ	20 10	43.6 21 05.8	d	USCGS: 24.5°S, 179.9°E, 0=19 59 15.0. Fiji Islands. h about 532 km.	
	MHC	eP	20 10	42.4	c		
	MIN	eP		52.9	d		
	CLS	eP		43.6	c		
	PRI	eP		43.2	c		
Oct. 28	MHC	eP	20 15	32.8	d		
	MIN	iP		16 41.9	c		
		eS		18 25.2			
	PRI	eP		15 21.9	d		
		eS		16 32.5	c		
Oct. 28	MIN	eZ	20 47	17.0	c	USCGS: 44.8°N, 149.6°E, 0=20 36 56.0. Kurile Islands. h about 45 km.	
Oct. 29	BKS	iP	07 02	29.4	c	BKS: 40°42'N, 126°14'W, 0=07 01 26.6. Off Cape Mendocino, California. h about 15 km. Magnitude 4.7 (BKS).	
	MHC	eP		39.1	d		
		e(S)Z		03 04.8			
	MIN	iP		02 19.6	c		
	CLS	iP		18.7	d		
	PRI	eP		59.0	c		
		e(S)		04 07.0			
Oct. 29	MHC	eP	16 01	11.3	d	USCGS: 24.8°S, 68.6°W, 0=15 49 10.3. Northern Chile. h about 67 km.	
	CLS	eP		18.5	d		
	PRI	eP		03.5	d		
Oct. 29	BKS	eZ	20 59.0		c	USCGS: 26.2°S, 177.8°W, 0=20 22 15.7. Kermadec Islands. h about 49 km.	
Oct. 29	BKS	eP	22 34	45.5	d	USCGS: 24.4°S, 176.1°W, 0=22 22 37.7. Tonga Islands. h about 33 km.	
	MHC	eP		45.4	c		
	MIN	iP		56.6	c		
	PRI	eP		43.8	c		
Oct. 30	MIN	eP	00 46	13.0	c	USCGS: 44.7°N, 150.0°E, 0=00 35 40.4. Kurile Islands. h about 55 km.	

Date	Sta.	Phase	Time (GCT)			Ground Motion	Remarks
			h	m	s		
1963							
Oct. 30	BKS	eP	01 27	33.2	c	USCGS: 4.8°S, 77.9°W, 0=01 17 31.1. Northern Peru. h about 20 km.	
	MHC	eP		28.6	c		
	MIN	iP		39.5	c		
	CLS	eP		37.4	c		
	PRI	eP		28.1	c		
Oct. 31	BKS	eP	03 29	34.2	Nc	USCGS: 21.8°S, 175.0°W, 0=03 17 42.0. Tonga Islands. h about 33 km. Magnitude 5.6 (BKS).	
		iPP		32 40.0	d		
		eSNE		39 28	NWd		
		e(G)NE		49.3			
		i(R)NE		54.2			
			mu	sec			
		PZ	1.55	10			
		PPZ	6.9	9			
		SH	5.9	18			
		MaxH	18.8	16			
	MHC	eP		29 34.4	c		
	MIN	eP		45.8	c		
	CLS	eP		36.5	c		
	PRI	eP		35.3	c		
Oct. 31	MIN	iP	04 37	18.8	d	USCGS: 23.9°S, 179.8°W, 0=04 25 38.0. Fiji Islands. h about 464 km.	
Oct. 31	BKS	eP	09 02	31.2	c	USCGS: 17.9°S, 178.8°W, 0=08 51 42. Fiji Islands. h about 637 km.	
	MHC	eP		36	c		
	MIN	iP		41.1	d		
	CLS	eP		32.5	d		
	PRI	eP		32.9	d		
Nov. 1	MIN	eP	07 31	21.7	c		
Nov. 1	MIN	eZ	11 42	23.0	d	USCGS: 13.6°N, 90.1°W, 0=11 34 55.9. Off coast of El Salvador. h about 128 km.	
Nov. 1	BKS	eP	21 11	26.3	d	USCGS: 22.5°S, 176.8°W, 0=20 59 28.1. Solomon Islands. h about 71 km.	
	MHC	eP		26.9	d		
	CLS	eP		27.5	d		
	PRI	eP		26.2	d		
Nov. 1	BKS	eP	22 51	50.8	c	USCGS: 44.9°N, 148.9°E, 0=22 41 23.8. Kurile Islands. h about 60 km.	
	MHC	eP		51 55.7	c		
	MIN	iP		44.2	d		
	CLS	eP		46.5	c		
	PRI	eP		52 04.9	c		
Nov. 1	MIN	eP	08 50	31.6	c	USCGS: 32.4°N, 113.7°W, 0=08 47 43. Sonora, Mexico. h about 14 km.	
		eS		53 24.2			
Nov. 2	MHC	eP	18 03	57.0	d	USCGS: 44.0°N, 150.5°E, 0=17 53 27.2. Kurile Islands. h about 50 km.	
	MIN	eP		45.0	d		
	CLS	eP		48.3	c		
	PRI	eP		04 06.2	d		
Nov. 2	MHC	eP	21 47	25.8	d	USCGS: 24.3°S, 68.1°W, 0=21 35 29.8. Chile-Argentina border. h about 106 km.	
	MIN	eP		35.1	c		
	CLS	eP		33.0	c		
	PRI	eP		18.6	c		

Date	Sta.	Phase	Time (GCT)		Ground Motion	Remarks
			h	m s		
1963						
Nov. 3	BKS	iP	03 20	06.2	c	USCGS: 3.5°S, 77.8°W, 0=03 10 12.7.
		iPcP		58.8	c	Peru-Ecuador border. h about 33 km.
		ePP	22 20		c	Magnitude 6.2 (BKS).
		iSNE	28 08		SEd	
		eSSNE		32.0		
		e(G)NE		35.2		
		e(R)		39.8		
			mu	sec		
		PZ	7.2	14		
		PPZ	0.075	1.5		
		SH	10.2	20		
		MaxH	33.5	40		
	MHC	eP		01.2	d	
	MIN	eP		12.0	c	
		iPP	22	32.4	d	
	CLS	eP	20	10.0	d	
	PRI	eP	19	52.9	c	
Nov. 3	MIN	eP	03 49	34.7	d	
Nov. 3	BKS	eP	07 49	09.5	c	USCGS: 15.6°S, 73.3°W, 0=07 38 10.7.
	MHC	eP		10.2	d	Southern Peru. h about 112 km.
	MIN	eP		46.9	d	
	CLS	eP		08.3	c	
	PRI	eP		01.3	d	
Nov. 3	BKS	eP	01 26	49.3	c	USCGS: 15.1°S, 167.3°E, 0=01 14 32.8.
		eZ	27	10.0	c	New Hebrides Islands.
		iZ		20.0	d	h about 154 km.
	MHC	eP		50.8	c	
	MIN	eP		55.7	c	
	CLS	eP		49.4	c	
	PRI	eP		52.5	c	
Nov. 4	BKS	eP	01 31	29.0	d	USCGS: 6.8°S, 129.6°E, 0=01 17 08.9.
		iZ		49.0	c	Banda Sea. h about 80 km.
		iP		28	c	Felt: Throughout Australia.
	MHC	eP		29.4	d	
	MIN	eP		32.6	c	
	CLS	eP		27.7	c	
	PRI	eP		35.5	d	
Nov. 4	BKS	eP	01 35	34.4	c	
	MHC	eP		36.2	c	
	MIN	iP		27.2	c	
	CLS	eP		32.7	d	
	PRI	eP		38.0	d	
Nov. 6	BKS	eP	02 26	58	d	USCGS: 2.6°S, 138.4°E, 0=02 13 16.8.
		ePP		31 00	d	Western New Guinea. h about 33 km.
		eSKSE		37 38	Wd	Magnitude 6.7 (BKS).
		eSNE		38 24	SE	
		ePSE		39 54	Wd	
		eSSNE		48 20	NWd	
		e(G)NE		53.0		

Date	Sta.	Phase	Time (GCT)		Ground Motion	Remarks
			h	m s		
1963						
Nov. 6		e(R)E		57.7		
(Cont.)			mu	sec		
		PZ	1.94	7		
		PPZ	1.82	7		
		SH	2.34	32		
		MaxH	13	20		
Nov. 6	BKS	eEZ	17	04.2		
		eNZ		26.8		
Nov. 6	BKS	iP	18 44	41.8	c	USCGS: 16.7°S, 16.7°W, 0=18 33 25.9.
	MHC	eP		38.0	d	Peru-Bolivia border.
	MIN	eP		47.5	c	h about 174 km.
	CLS	eP		45.5	c	
	PRI	eP		29.9	c	
Nov. 7	MIN	eZ	09 14	13.5	d	USCGS: 44.2°N, 149.7°E, 0=09 03 53.4.
						Kurile Islands. h about 45 km.
Nov. 7	MIN	eP	09 33	08.2	d	USCGS: 44.2°N, 151.1°E, 0=09 22 53.3.
						Kurile Islands. h about 50 km.
Nov. 7	BKS	eP	13 07	47.3	d	USCGS: 14.1°N, 146.2°E, 0=12 55 25.6.
	MHC	eP		50.0	d	Mariana Islands. h about 48 km.
	MIN	iP		46.2	c	
	CLS	eP		44.3	c	
	PRI	eP		46.3	d	
Nov. 7	BKS	eP	13 10	02.4	d	
	MHC	eP		06.4	c	
	MIN	iP	09	53.7	c	
	CLS	eP		57.9	c	
	PRI	eP	10	15.5	d	
Nov. 8	MIN	iP	05 16	17.5	c	USCGS: 21.5°S, 179.7°W, 0=05 05 03.0.
						Fiji Islands. h about 659 km.
Nov. 8	MHC	eP	10 19	05.5	d	USCGS: 16.5°S, 28.5°E, 0=09 59 24.3.
	MIN	iP		18 59.6	c	Northern Rhodesia. h about 33 km.
	CLS	eP		19 04.0	c	
	PRI	eP		04.8	c	
Nov. 9	MIN	eP	01 38	49.0	d	
Nov. 9	MIN	iP	09 01	33.4	c	USCGS: 45.3°N, 150.8°E, 0=08 51 18.6.
						Kurile Islands. h about 33 km.
Nov. 9	BKS	eP	21 25	23.3	d	USCGS: 9.0°S, 71.5°W, 0=21 15 30.4.
		ePP		27 34.3	c	Peru. h about 600 km.
		eSNE		33 31.7	SW	Magnitude 6.2 (BKS).
		eScS		35 15.8	d	
		eP'P'		53 08.5	d	
			mu	sec		
		PZ	21.2	15		
	MHC	iP		20.3	d	
		eS		33 31.8		
		eP'P'		53 11.5	d	

Date	Sta.	Phase	Time (GCT)		Ground Motion	Remarks
			h	m s		
1963						
Nov. 9 (Cont.)	MIN	iP		28.5	d	
		eSE	33	52		
	CLS	eP	25	27.0	d	
		eS	33	47.0	d	
		eP'P'	53	05.5	c	
	PRI	eP	25	11.5	d	
		eS	33	01	d	
		eP'P'	53	12.3	d	
Nov. 9	BKS	iP	23 24	04.3	c	USCGS: 8.5°S, 72.1°W, O=23 14 12.6. Western Brazil. h about 563 km.
	MHC	eP		00.0	d	
	MIN	iP		09.0	c	
	CLS	eP		07.6	d	
	PRI	eP		51.3	d	
Nov. 10	BKS	iPNE	01 10	33.3	SEd	USCGS: 9.2°S, 71.5°W, O=01 00 38.5. Western Brazil. h about 600 km. Magnitude 5 3/4 (BKS).
		eSNE	18	41	SEc	
		eNE	19	27	SEd	
			mu	sec		
		PZ	5.12	12		
	MHC	iP	01 10	29.3	d	
		eS	18	30.0	d	
		eP'P'	38	52		
	MIN	iP	10	37.6	d	
	CLS	eP		36.8	d	
		eS	18	47.5	c	
		eP'P'	38	48.5	c	
	PRI	eP	10	20.3	d	
		eS	18	17.2	d	
		eP'P'	38	49.2	c	
Nov. 10	MIN	iP	09 00	27.1	c	USCGS: 44.5°N, 149.4°E, O=08 50 06.1. Kurile Islands. h about 45 km.
Nov. 10	BKS	eP	17 28	15.0	c	USCGS: 44.4°N, 149.0°E, O=17 17 42.7. Kurile Islands. h about 40 km. Magnitude 5.7 (BKS).
		eZ		27.2		
		eS		14		
		iSE	36	48	E	
		iN	36	52	N	
		iSSE	41	04		
		i(G)NE	44.0			
		e(R)NE	47.6			
			mu	sec		
		PZ	2.08	12		
		SH	5.13	22		
		MaxH	12.9	40		
	MHC	eP		20.5	c	
	MIN	iP		08.7	c	
	CLS	eP		11.4	c	
	PRI	eP		27.6	d	
Nov. 11	MIN	iP	02 24	39.1	c	

Date	Sta.	Phase	Time (GCT)		Ground Motion	Remarks
			h	m s		
1963						
Nov. 11	MIN	iP	04 44	04.8	c	
Nov. 11	MIN	eP	08 21	28.5	c	
Nov. 11	MIN	eP	10 00	04.5	c	USCGS: 44.6°N, 148.9°E, O=09 49 43.3. Kurile Islands. h about 55 km.
Nov. 11	BKS	eP	11 40	20.0	c	USCGS: 16.9°S, 174.4°W, O=11 29 06.4. Tonga Islands. h about 185 km.
	MHC	eP		18.0	d	
	MIN	iP		30.4	d	
	CLS	eZ		16.3	c	
		eP		20.7	c	
	PRI	eP		16.5	c	
Nov. 11	BKS	eP	20 04	05.2	d	USCGS: 9.1°S, 71.4°W, O=19 54 09.4. Western Brazil. h about 585 km.
	MHC	eP		01.3	d	
	MIN	eP		09.6	d	
	CLS	eP		08.7	d	
	PRI	eP		52.5	d	
Nov. 11	MHC	eP	20 27	18.3	d	USCGS: 4.0°N, 82.6°W, O=20 18 39.7. Off western coast of Colombia. h about 33 km.
	MIN	eP		35.4	c	
	CLS	eP		15.0	c	
	PRI	eP		14.0	d	
Nov. 12	MIN	eP	08 07	17.6	d	USCGS: 44.2°N, 149.0°E, O=07 56 53.6. Kurile Islands. h about 45 km.
Nov. 12	MIN	eP	08 43	38.8	c	USCGS: 44.2°N, 149.2°E, O=08 33 15.9. Kurile Islands. h about 50 km.
Nov. 12	MIN	eP	12 56	12.1	c	USCGS: 22.6°S, 175.5°W, O=12 44 02.4. Tonga Islands. h about 33 km.
Nov. 12	MHC	eP	13 10	34.5	d	USCGS: 44.2°N, 149.4°E, O=13 00 00.7. Kurile Islands. h about 50 km.
	CLS	eP		15.5	d	
	PRI	eP		51.0	c	
Nov. 13	BKS	iP	11 29	54.8	d	USCGS: 23.8°S, 179.9°E, O=11 18 28.6. Fiji Islands. h about 520 km.
	MHC	eP		58.5	c	
	MIN	eP		30 03.6	d	
	CLS	eP		29 55.4	c	
	PRI	eP		54.3	c	
Nov. 13	MIN	eZ	13 19	19.1	c	USCGS: 44.9°N, 148.8°E, O=13 09 00.7. Kurile Islands. h about 40 km.
Nov. 13	BKS	eP	17 30	51.2	c	USCGS: 22.9°S, 175.3°W, O=17 18 50.1. Tonga Islands. h about 33 km.
	MHC	eP		50.6	d	
	MIN	eZ		31 00.7	d	
	CLS	eP		30 51.3	d	
	PRI	eP		49.5	c	
Nov. 13	BKS	eP	20 07	02.8	c	USCGS: 25.3°N, 109.3°W, O=20 03 06.6. Gulf of California. h about 14 km.
		eNE		10 20.0	NW	
	MHC	eP		06 52.4	d	
	MIN	iP		07 29.3	d	
	CLS	eP		07.8	c	
	PRI	eP		06 38.7	c	

Date	Sta.	Phase	Ground		Remarks	
			Time (GCT)	Motion		
1963			h	m	s	
Nov. 14	MHC	eP	04 10	44.3	c	USCGS: 22.6°N, 142.9°E, 0=03 58 48.9. Mariana Islands. h about 177 km.
	MIN	iP		38.5	c	
	CLS	eP		38.2	c	
	PRI	eP		51.5	c	
Nov. 14	BKS	eP	04 48	30	d	USCGS: 17.5°S, 167.7°E, 0=04 35 48.5. New Hebrides Islands. h about 33 km.
		eSEZ		59 03		
		eE		05 00.0		
		e(R)E		05 14.7		
	MHC	eP		27.5	d	
	MIN	iP		39.3	d	
	CLS	eP		28.6	c	
	PRI	eP		29.0	d	
Nov. 14	MHC	eP	09 12	15	c	USCGS: 15.1°N, 93.9°W, 0=09 05 47.8. Off coast of Chiapas, Mexico. h about 33 km.
	CLS	eP		18.7	d	
	PRI	eP		11.4	d	
Nov. 15	BKS	eP	21 17	04.0	c	USCGS: 44.3°N, 149.0°E, 0=21 06 34.0. Kurile Islands. h about 50 km. Magnitude 6.1 (BKS).
		iSNE		25 40	NWc	
		i(G)NE		33.1		
		i(R)NE		36.3		
			mu	sec		
		PZ		0.025 0.8		
		SH		14.1 34		
		MaxH		25.3 34		
	MHC	eP		09.3	d	
	MIN	iP		16 57.2	c	
		ipP		17 09.4	c	
	CLS	eP		00.0	d	
	PRI	eP		18.3	c	
Nov. 15	CLS	eZ	21 45	10	d	
	PRI	eZ		44 44	c	
Nov. 16	BKS	iP	02 40	38	c	USCGS: 44.3°N, 149.0°E, 0=02 30 07.0. Kurile Islands. h about 50 km.
		eSNE		49 16	NE	
		e(G)NE		56.6		
		e(R)		59.8		
	MHC	eP		40 41.1	d	
	MIN	eP		32.3	d	
	CLS	eP		25.2	d	
	PRI	eP		52.3	d	
Nov. 16	BKS	eP	06 58	51.8	c	USCGS: 41.3°S, 87.5°W, 0=06 46 15.7. Off coast of Chile. h about 11 km.
		e(G)E		07 21.9		
		e(R)N		26.0		
	MHC	eP		06 58 50.6	c	
	MIN	eP		59 02.6	c	
	CLS	eP		58 55.6	d	
	PRI	eP		43.0	d	
Nov. 16	MIN	iP	16 49	27.5	c	USCGS: 38.0°N, 117.1°W, 0=16 48 10.2. Central Nevada. h about 15 km. Magnitude 4.0 (USCGS).

Date	Sta.	Phase	Ground		Remarks	
			Time (GCT)	Motion		
1963			h	m	s	
Nov. 16	BKS	eP	22 55	23.1	c	USCGS: 22.3°S, 175.0°W, 0=22 43 26.4. Tonga Islands. h about 33 km. Magnitude 5.4 (BKS).
		iSE		23 05 16	E	
		e(G)E		15.2		
		e(R)E		18.5		
			mu	sec		
		PZ		1.6 10		
	MHC	eP		23.4	c	
	MIN	eP		29.3	c	
		ipP		43.6	d	
	CLS	eP		23.8	d	
	PRI	eP		21.7	d	
Nov. 16	MIN	iZ	22 51	12.6	d	USCGS: 38.0°N, 117.0°W, 0=22 51 25.8. Central Nevada. h about 15 km.
		iS		52 23.7		
Nov. 16	BKS	eP	23 51	55.0	Ec	USCGS: 22.1°S, 175.3°W, 0=23 34 58.3. Tonga Islands. h about 33 km.
	MHC	eP		55.5	c	
	MIN	iP		52 06.3	c	
	CLS	eP		51 56.6	d	
	PRI	eP		54.9	d	
Nov. 17	BKS	eP	01 00	20.3	d	USCGS: 7.6°N, 37.4°W, 0=00 48 02.6. North Atlantic Ocean. h about 33 km. Magnitude 5.7 (BKS).
		ePP		03 34	d	
		eSE		10 32	Wd	
		eSSS		19 30		
		e(G)E		22.0		
		e(R)E		26.5		
			mu	sec		
		PZ		1.22 26		
		PPZ		0.05 1.2		
	MHC	eP		00 17.0	d	
	MIN	eP		14.7	c	
	CLS	eP		20.3	c	
	PRI	eP		13.9	d	
Nov. 17	BKS	iP	01 25	30.0	c	USCGS: 21.8°S, 175.0°W, 0=01 31 36.0. Tonga Islands. h about 33 km.
	MHC	eP		30.3	c	
	MIN	eP		39.9	c	
	CLS	eP		30.8	d	
	PRI	eP		29.0	d	
Nov. 17	MIN	eP	08 54	24.1	c	
Nov. 17	MIN	iP	11 12	51.8	c	
Nov. 17	BKS	eP	13 24	46.5	d	USCGS: 17.4°S, 178.5°W, 0=13 13 49.3. Fiji Islands. h about 509 km.
	MHC	eP		47.2	d	
	MIN	iP		25 56.3	c	
	CLS	eP		24 47.2	d	
	PRI	eP		47.2	d	
Nov. 18	MIN	eP	01 55	14.1	c	USCGS: 47.2°N, 148.5°E, 0=01 45 27.6. Sea of Okhotsk. h about 319 km.
Nov. 18	MIN	eP	14 03	03.8	d	USCGS: 15.9°S, 173.3°W, 0=13 51 35.8. Tonga Islands. h about 33 km.

Date	Sta.	Phase	Ground		Remarks		
			Time (GCT)	Motion			
1963			h	m	s		
Nov. 18	BKS	ipNE	14	41	03	USCGS: 29.9°N, 113.6°W, 0=14 38 28.9. Gulf of California. h about 14 km.	
		eSE		43	22		NWc
		eNE			28		Wd
				mu	sec		
		MaxH		190	20		
	MHC	eP		40	54.8	c	
		eS		43	11.9		
	MIN	iP		41	31.5	d	
		eP			14.4	c	
	PRI	eP		40	35.2	d	
eS			42	50.0	d		
Nov. 18	MIN	eP	16	05	23.6	c	
Nov. 18	BKS	eLNE	19	12.5		USCGS: 29.7°N, 113.8°W, 0=16 02 19.9. Gulf of California. h about 14 km. USCGS: 29.1°N, 114.1°W, 0=19 07 47.7. Baja California. h about 14 km.	
			mu	sec			
		MaxH	4.4	18			
Nov. 18	PRI	eP	19	18	12.7	d	
Nov. 18	BKS	eLE	19	38.3		USCGS: 30.0°N, 113.7°W, 0=19 33 35.9. Gulf of California. h about 14 km.	
			mu	sec			
		MaxH	3.5	14			
Nov. 18	MIN	eZ	19	40.4			
		eP		35	07.0	d	
Nov. 18	BKS	e(R)	21	49.0		USCGS: 13.4°S, 166.6°E, 0=21 11 10.2. Santa Cruz Islands. h about 51 km.	
		eP		23	44.4		c
Nov. 18	BKS	eLNE	22	05.2		USCGS: 31.9°N, 113.3°W, 0=21 01 10. Sonora, Mexico. h about 14 km.	
		e(R)		06.2			
			mu	sec			
	MaxH		8.3	18			
Nov. 18	MIN	eZ	22	03	56.0	c	
		PRI		02	47.4	c	
Nov. 19	BKS	eSE		04	55		
		eLNE	01	15.7		USCGS: 31.0°N, 113.7°W, 0=01 11 43.2. Gulf of California. h about 14 km.	
e(R)		17.0					
			mu	sec			
	MaxH		6.4	20			
Nov. 19	MHC	eP	14	12.5		c	
		eZ		41.9		c	
Nov. 19	MIN	eP		19.5		d	
		eP		13	42		c
Nov. 19	MIN	eS		15	59		d
		eP	02	11	34.8		c
Nov. 19	MIN	eP	04	48	56.5		c
Nov. 19	BKS	eN	08	26	40		USCGS: 44.1°N, 150.2°E, 0=02 01 16. Kurile Islands. h about 50 km. USCGS: 39.7°N, 129.5°E, 0=04 37 56.8. Off east coast of Korea. h about 537 km.
		eLNE		27.6			
		e(R)		28.4			

Date	Sta.	Phase	Ground		Remarks			
			Time (GCT)	Motion				
1963			h	m	s			
Nov. 19 (Cont.)			mu	sec				
		MaxH	25	18				
	MHC	eZ	25	30.4		c		
	MIN	eP	26	02.9		c		
	CLS	eZ	26	02.9		c		
Nov. 19	PRI	eP	25	07.0		d		
		eS		27	51.5			
		eZ	11	26.0				
Nov. 19	BKS	eP	10	58	32.0	d		
		eP			32.8	c		
Nov. 19	BKS	eLNE	10	56.2		USCGS: 22.5°S, 171.3°E, 0=10 45 49.1. Loyalty Islands. h about 36 km.		
		e(R)		57.4				
			mu	sec				
		MaxH	3.4	20				
Nov. 19	PRI	eP		53	12.3		c	
		eP	11	11	25.3			
Nov. 19	MHC	eP			30.2		d	
		iP			39.9		d	
Nov. 19	MIN	ipP			33.7		c	
		eP			20.0		d	
Nov. 19	PRI	eP			39.2		d	
		eP	17	47	32.9		c	
Nov. 19	MIN	eP						
Nov. 19	MIN	eP	01	17	23.3		c	
Nov. 20	BKS	eP	12	11	56.2		USCGS: 53.1°N, 159.6°E, 0=17 38 39.7. Off east coast of Kamchatka. h about 40 km.	
		eL			35.2			
Nov. 20	MHC	eP			56.2		d	
		iP			12	00		d
Nov. 20	CLS	eP			11	57.1		d
		eP			55.2		d	
Nov. 21	BKS	eP	01	13	56.2		BKS: 35° 05'N, 119°15'W, 0=01 12 57.5. Southwest of Bakersfield, California. h about 15 km.	
		eP			14	25.4		
Nov. 21	MIN	i(S)			15	30.6		
		eP			13	25.9		
Nov. 21	PRI	eP			13	25.9		
		eZ	20	35	26.5		c	
Nov. 21	BKS	eP	21	11	14.3		USCGS: 11.1°S, 166.3°E, 0=20 23 11.8. Santa Cruz Islands. h about 149 km. USCGS: 50.3°N, 156.4°E, 0=21 01 35.3. Southern Kamchatka. h about 80 km.	
		eP			19.2			
Nov. 21	MHC	eP			05.6		d	
		iP			21.9		c	
Nov. 21	CLS	eP			08.9		c	
		eP			24.9		c	
Nov. 22	BKS	eP	11	19	48.5		USCGS: 18.5°N, 100.3°W, 0=11 14 03.0. Guerrero, Mexico. h about 120 km.	
		e(S)NE			24	24		NW
		e(G)NE			26.0			
		e(R)E			27.7			

Date	Sta.	Phase	Ground		Remarks		
			Time (GCT)	Motion			
			h	m	s		
1963							
Nov. 22	MHC	eP	19	30.5	d		
(Cont.)	MIN	iZ		59.3	d		
	CLS	eP		43.4	c		
	PRI	eP		18.7	c		
Nov. 22	BKS	iP	14	56	23.5	c	USCGS: 44.4°N, 149.0°E, 0=14 45 51.7. Kurile Islands. h about 33 km.
		eSE	04	58	Ed		
		eE	09	12	W		
		e(G)NE		12.0			
		e(R)		15.4			
	MHC	eP		28.0	c		
	MIN	eP		05.5	c		
		ipP		29.6	d		
	CLS	eP		19.0	c		
	PRI	eP		36.7	c		
Nov. 22	BKS	eP	17	15	08.0	d	USCGS: 17.9°S, 172.8°W, 0=17 03 38.9. Tonga Islands. h about 33 km.
	MHC	eP		08.4	d		
	MIN	iP		18.5	c		
	CLS	eP		10.8	c		
	PRI	eP		06.5	c		
Nov. 22	BKS	iP	19	08	51.3	c	USCGS: 21.0°S, 67.9°W, 0=18 57 02.5. Western Bolivia. h about 87 km.
	MHC	eP		47.5	d		
	MIN	eP		56.9	c		
	CLS	eP		53.9	c		
	PRI	eP		40.0	c		
Nov. 23	BKS	iP	07	53	16.7	c	USCGS: 30.1°N, 114.0°W, 0=07 50 46.3. Gulf of California. h about 14 km. Magnitude 6 (BKS).
		iSNE		55	16	SWd	
			mu	sec			
		PZ		2.79	12		
		MaxH		94.5	11		
	MHC	eP		05.2	d		
	MIN	eZ		42.2	d		
	CLS	eP		26.0	d		
	PRI	eP		46.1	c		
Nov. 23	BKS	eP	08	19	48.5	c	USCGS: 30.0°N, 113.9°W, 0=08 17 16.6. Gulf of California. h about 14 km.
	MIN	iP		20	17.2	c	
	PRI	eP		19	15.6	c	
Nov. 23	BKS	eP	08	35	03.3	c	USCGS: 29.9°N, 114.0°W, 0=08 32 31. Gulf of California. h about 14 km.
		i(S)NE		37	03	SW	
		e(R)		46			
	MHC	eP		34	56	c	
	MIN	eP		35	18.8	c	
	CLS	eP		08.5	c		
	PRI	eP		34	31.0	d	
Nov. 23	PRI	eP	08	49	21.2	d	USCGS: 29.7°N, 114.3°W, 0=08 47 17.4. Baja California. h about 14 km.
Nov. 23	MIN	iP	09	02	07.0	d	
Nov. 23	MIN	eZ	19	10	57	d	USCGS: 45.1°N, 151.5°E, 0=19 00 35.6. Kurile Islands. h about 45 km.

Date	Sta.	Phase	Ground		Remarks		
			Time (GCT)	Motion			
			h	m	s		
1963							
Nov. 23	BKS	iP	19	41	26.3	c	USCGS: 20.2°S, 178.1°W, 0=19 30 19.4. Fiji Islands. h about 515 km.
	MHC	eP			26.5	d	
	MIN	iP			36.1	d	
	CLS	eP			26.7	d	
	PRI	eP			26.0	d	
Nov. 24	MIN	iP	05	20	50.7	c	USCGS: 22.1°S, 175.6°W, 0=05 08 42.8. Tonga Islands. h about 33 km.
Nov. 24	BKS	eP	05	25	20.5	c	USCGS: 21.9°S, 175.8°W, 0=05 13 23.5. Tonga Islands. h about 33 km.
	MHC	eP			21.0	d	
	MIN	eZ			31.1	c	
	CLS	eP			22.5	d	
	PRI	eP			20.3	c	
Nov. 24	BKS	eP	11	17	32.4	d	USCGS: 28.2°N, 140.1°E, 0=11 05 56.8. South of Honshu, Japan. h about 260 km.
	MHC	eP			36.3	d	
	MIN	iP			28.4	d	
	CLS	eP			29.3	d	
	PRI	eP			43.3	d	
Nov. 27	BKS	eP	23	02	17.0	d	USCGS: 16.6°S, 72.1°W, 0=22 50 08.9. Fiji Islands. h about 79 km.
		eSNE		12	24	NEd	
		eNE		13	12	SWd	
		e(G)NE		23.3			
		e(R)NE		26.4			
			mu	sec			
		SH		1.59	24		
		MaxH		4.25	32		
	MHC	eP			18.6	c	
	MIN	iZ			25.6	c	
	CLS	eP			17.4	d	
	PRI	eP			18.0	d	
Nov. 27	BKS	iP	02	30	59.3	d	USCGS: 16.6°S, 72.1°W, 0=02 19 41.9. Southern Peru. h about 79 km.
	MHC	eP			55.3	d	
	MIN	eP		31	01.9	c	
	CLS	eP			02.5	c	
	PRI	eP		30	43.7	d	
Nov. 27	MIN	eP	20	28	11.9	c	USCGS: 45.8°N, 151.8°E, 0=20 18 01. Kurile Islands. h about 40 km.
Nov. 29	BKS	eP	15	01	30.7	d	USCGS: 23.7°N, 143.2°E, 0=14 49 26.6. Bonin Islands. h about 33 km.
	MHC	eP			34.3	d	
	MIN	eP			27.2	c	
	PRI	eP			41.0	d	
Nov. 30	MIN	eP	21	59	14.6	c	USCGS: 6.6°N, 94.2°E, 0=21 40 20.3. Nicobar Islands. h about 33 km.
Dec. 1	BKS	eP	04	37	46.5	d	USCGS: 56.1°N, 111.8°E, 0=04 26 12.8. Lake Baikal. h about 33 km.
	MHC	eP			38 00.6	d	
	MIN	iP			37 44.8	d	
	CLS	eP			52.3	d	
	PRI	eP			38 09.4	d	

Date	Sta.	Phase	Ground		Remarks		
			Time (GCT)	Motion			
1963			h	m	s		
Dec. 2	MIN	eP	06 56	07.6	c	USCGS: 54.1°N, 134.2°W, 0=06 52 20. Queen Charlotte Islands. h about 33 km.	
	PRI	eP		54.5	c		
Dec. 2	MIN	iP	07 01	11.1	c	USCGS: 54.0°N, 134.5°W, 0=06 57 19.9. Queen Charlotte Islands. h about 33 km.	
Dec. 2	BKS	eP	21 05	52.0	d	USCGS: 80.1°N, 0.6°W, 0=20 55 58.8. Svalbard region. h about 33 km. Magnitude 5 (BKS).	
		eSNE		13 50	NEd		
		eSSNE		17 48	NW		
		e(G)E		19.8			
		e(R)N		23.0			
			mu	sec			
		PZ		0.36	3		
		SH		1.40	24		
		MaxH		12.50	24		
		MHC	eP		53	d	
Dec. 2	BKS	CLS		45.7	d	USCGS: 51.5°N, 174.0°W, 0=23 52 38.3. Andreanof Islands. h about 55 km.	
		PRI		06 01.5	c		
		eP	23 59	56.5	c		
		iZ	00 00	10.2	c		
		eSNE	08 48		SE		
	MHC	eP	00 03.0	d			
	MIN	iZ		01.0	c		
	CLS	eP	59 51.5	d			
	PRI	eP	00 14.7	d			
Dec. 3	MIN	iP	03 54	48.7	d	USCGS: 45.4°N, 151.6°E, 0=03 44 39.2. Kurile Islands. h about 45 km.	
Dec. 3	MIN	iP	04 36	57.7	c	USCGS: 4.2°S, 102.9°E, 0=04 17 58. Near south coast of Sumatra. h about 50 km.	
Dec. 3	MHC	eP	05 19	36.5	d	USCGS: 46.2°N, 153.0°E, 0=05 09 22.0. Kurile Islands. h about 40 km.	
			MIN		23.9		d
		ipP		35.9	c		
		CLS	eP		27.1		d
		PRI	eP		45.9		d
Dec. 3	MIN	eP	08 49	08.3	c	USCGS: 46.1°N, 152.9°E, 0=08 39 07.4. Kurile Islands. h about 45 km.	
Dec. 3	BKS	eP	21 27	40	d	USCGS: 12.2°S, 166.0°E, 0=21 15 10. Santa Cruz Islands. h about 32 km.	
		eSNE		38 24	SW		
		eE		39.0			
		e(G)N		49.4			
		e(R)E		54.2			
		MHC	eP	27 43.5	d		
		MIN	eZ		59.9	c	
		CLS	eP		45.0	d	
		PRI	eP		45.5	c	

Date	Sta.	Phase	Ground		Remarks		
			Time (GCT)	Motion			
1963			h	m	s		
Dec. 3	BKS	iP	23 15	41.5	d	USCGS: 22.4°S, 69.3°W, 0=23 03 41.6. Northern Chile. h about 18 km.	
		eSNE		25 30	NE		
		eSSNE		30 36	NWd		
		e(G)NE		36.9			
		e(R)NE		40.9			
		mu	sec				
		PZ	2.8	12			
		SH	2.1	34			
		MaxH	4.3	30			
	MHC	eP	15	36.1	c		
	MIN	eP		45.7	d		
		ipP		48.3	d		
	CLS	eP		42.9	d		
	PRI	eP		27.5	c		
Dec. 4	BKS	eP	00 57	32	c	USCGS: 30.4°S, 179.3°W, 0=00 44 37.4. Kermadec Islands. h about 33 km.	
		MHC		33	c		
		MIN		40			
		CLS	eP		31.2		d
		PRI	eP		29		d
Dec. 4	BKS	eP	01 37	50.5	d	USCGS: 46.2°N, 153.1°E, 0=01 27 34.1. Kurile Islands. h about 20 km.	
		e(S)NE		45 52	NEd		
		e(G)NE		52.4			
		e(R)E		54.9			
		MHC	eP	37	49		c
	MIN	eP		42.3	d		
	CLS	eP		45.5	d		
	PRI	eP		59.0	c		
Dec. 4	BKS	eP	02 53	52.3	c	USCGS: 45.9°N, 153.2°E, 0=02 43 30.4. Kurile Islands. h about 50 km.	
		MHC		48	d		
		MIN	eP		31.2		d
		CLS	eP		44.8		c
		PRI	eP		57.6		d
Dec. 4	BKS	iP	04 23	39.0	c	USCGS: 19.5°N, 108.3°W, 0=04 18 46.3. Revilla Gigedo Islands. h about 33 km.	
		e(S)NE		27 48	SW		
		e(G)NE		28.6			
		e(R)NE		29.5			
		MHC	eP	23	30.6		d
	MIN	iP		57.5	d		
	CLS	eP		47.2	c		
	PRI	eP		16.3	c		
Dec. 4	BKS	eP	08 34	39.5	d	USCGS: 46.1°N, 152.9°E, 0=08 24 17.1. Kurile Islands. h about 33 km.	
		MHC		31.1	d		
		MIN	eP		20.5		c
		CLS	eP		25.6		c
		PRI	eP		40.6		c
Dec. 4	MIN	eZ	15 54	55.1	c	USCGS: 46.0°N, 153.2°E, 0=15 44 52.9. Kurile Islands. h about 40 km.	

Date	Sta.	Phase	Ground		Remarks
			Time (GCT)	Motion	
			h	m	s
1963					
Dec. 4	BKS	eP	16 11 27	c	USCGS: 35.5°S, 102.8°W, 0=15 59 42.1. Easter Island. h about 33 km.
		e(R)NE	34.2		
	MHC	eP	11 22.6	c	
	CLS	eP	29.3	c	
	PRI	eP	13.2	c	
Dec. 5	BKS	iP	04 35 09.0	c	USCGS: 35.7°S, 103.1°W, 0=04 23 22.2. Easter Island. h about 33 km.
		e(G)E	55.0		
		e(R)NE	59.0		
	MHC	eP	35 02.7	c	
	MIN	eP	20.9	d	
	CLS	eP	34 58.6	d	
	PRI	eP	41.0	d	
Dec. 5	BKS	e(S)E	11 46.0	W	USCGS: 7.4°N, 77.3°E, 0=11 29 49.4. Colombia. h about 33 km.
		e(L)NE	54.0		
		e(R)N	57.8		
	MHC	eZ	38 44.5	c	
	MIN	eZ	59.0	c	
	PRI	eZ	12.0	c	
Dec. 6	BKS	eP	08 35 11.5	d	BKS: 37°32'N, 118°25'W, 0=08 34 25.7. Mono County, California. h about 20 km. Magnitude 4.7 (BKS). Felt: Bishop, Oakhurst.
		iSNE	47.8		
	MHC	eP	05.3		
	MIN	iP	22.5	c	
	CLS	eP	16.8	c	
	PRI	iP	01.5	d	
Dec. 6	MHC	iZ	13 55 55.6		BKS: 34.4°N, 116.9°W, 0=13 54 00.1. San Bernardino County, California. h about 15 km. Magnitude 4.1 (USCGS).
	MIN	iP	49.1	d	
Dec. 7	BKS	eP	04 19 08.7	c	USCGS: 22.1°S, 179.4°W, 0=04 07 52.6. Fiji Islands. h about 546 km.
	MHC	eP	10.0	c	
	MIN	eP	17.1	c	
	CLS	eP	10.0	d	
	PRI	eP	09.1	d	
Dec. 7	MHC	eP	04 59 07.2	d	USCGS: 18.8°S, 169.2°E, 0=04 46 52.2. New Hebrides Islands. h about 227 km.
	MIN	iP	13.6	c	
	PRI	eP	08.1	c	
Dec. 7	BKS	eP	10 45 12	d	USCGS: 20.8°S, 174.0°E, 0=10 32 39.5. Fiji Islands. h about 33 km.
		e(S)NE	56 28	NE	
		e(L)NE	11 10.7		
	MHC	eP	45 13.3	c	
	MIN	eZ	19.4	c	
	CLS	eP	44 56.5	c	
	PRI	eP	45 03.9	c	
Dec. 7	BKS	eP	17 49 39.5	c	USCGS: 29.3°S, 178.5°W, 0=17 37 25.6. Kermadec Islands. h about 209 km.
	MHC	eP	40.0	d	
	MIN	iP	49.4	d	
	CLS	eP	40.9	c	
	PRI	eP	38.5	c	

Date	Sta.	Phase	Ground		Remarks
			Time (GCT)	Motion	
			h	m	s
1963					
Dec. 8	BKS	eP	08 03 26.8	d	USCGS: 46.4°N, 153.0°E, 0=07 53 15.1 Kurile Islands. h about 20 km.
		e(S)E	11 40		
		e(G)NE	18.5		
		e(R)E	21.0		
	MHC	eP	03 33.4	d	
	MIN	iP	18.5	d	
	CLS	eP	22.1	d	
	PRI	eP	38.0	c	
Dec. 9	MIN	eP	01 48 00.7	c	
Dec. 9	MHC	eP	05 44 41.9	c	USCGS: 54.9°N, 159.4°W, 0=05 38 29.5. Alaska Peninsula. h about 45 km.
	MIN	iP	27.2	c	
		ipP	37.0	c	
	CLS	eP	27.3	d	
	PRI	eZ	58	d	
Dec. 9	BKS	eP	11 04 56.5	d	USCGS: 21.1°S, 178.0°W, 0=10 53 39.4. Fiji Islands. h about 435 km.
	MHC	eP	57.2	d	
	MIN	eP	05 07.1	c	
	CLS	eP	04 57.7	d	
	PRI	eP	56.7	d	
Dec. 10	BKS	eN	04 04 30	S	USCGS: 6.2°S, 128.1°E, 0=03 31 21.1. Banda Sea. h about 366 km.
		eLNE	15.3		
	MIN	eZ	03 49 11.0	c	
Dec. 10	BKS	eP	06 49 41.2	d	USCGS: 58.1°S, 26.4°W, 0=06 30 54.8. Sandwich Islands. h about 110 km.
	MHC	eP	40.6	c	
	MIN	eP	43.7	c	
	CLS	eP	42.1	c	
	PRI	eP	43.9	c	
Dec. 10	MIN	iP	09 38 46.0	c	USCGS: 45.8°N, 151.7°E, 0=09 28 38.6. Kurile Islands. h about 50 km.
Dec. 10	BKS	iP	15 01 18.7	d	USCGS: 18.1°S, 68.5°W, 0=14 49 42.6. Western Bolivia. h about 79 km.
	MHC	eP	15.0	d	
	MIN	iP	24.3	c	
	CLS	eP	22.5	c	
	PRI	eP	06.5	d	
Dec. 10	MIN	iZ	22 30 10.2	d	USCGS: 34.1°N, 116.7°W, 0=22 26 09.7. San Bernardino County, California. h about 14 km.
Dec. 11	BKS	iP	00 59 08.5	Nc	USCGS: 15.1°S, 173.6°W, 0=00 47 48.3. Tonga Islands. h about 33 km.
		i(PcP)	29.0	c	
		i(S)NE	09		
		i(ScS)N	01 08 28	SEd	
		e(SSS)E	16.0		
		e(R)NE	19.7		
			mu	sec	
		PZ	1.3	6	
		SH	2.1	22	
		MaxH	6.7	32	
	MHC	eP	00 59 08.7	c	

Date	Sta.	Phase	Ground		Remarks
			Time (GCT)	Motion	
1963			h	m	s
Dec. 11	MIN	eP	18.7	c	
(Cont.)	CLS	eP	09.1	d	
	PRI	eP	07.6	d	
Dec. 11	BKS	iP	02 42 16.8	NEc	USCGS: 17.8°S, 178.6°W, 0=02 31 19.4. Fiji Islands. h about 537 km.
	MHC	eP	17.5	c	
	MIN	eP	25.6	c	
	CLS	eP	17.4	c	
	PRI	eP	17.6	c	
Dec. 11	BKS	iP	17 15 46.0	d	USCGS: 51.2°N, 179.3°W, 0=17 08 12.3. Andreanof Islands. h about 32 km.
		e(S)NE	22 16	NEd	
		e(G)NE	25.6		
		e(R)NE	27.4		
			mu	sec	
		SH	2.27	18	
		MaxH	2.03	18	
	MHC	eP	16 05.7	d	
	MIN	iP	15 54.8	d	
	CLS	eP	57.0	c	
	PRI	eP	16 10.5	c	
Dec. 12	BKS	eZ	00 43 40	d	USCGS: 18.7°N, 107.0°W, 0=00 38 24.6. Off coast of Jalisco, Mexico. h about 33 km.
		eSNE	47 52	NW	
		e(G)N	49.4		
		e(R)E	49.7		
	MHC	eP	43 23.3	c	
	MIN	eP	46.9	c	
	CLS	eP	38.0	c	
	PRI	eP	08.9	c	
Dec. 12	BKS	eP	21 03 54.5	d	USCGS: 5.7°N, 73.1°W, 0=20 54 34.8. Colombia. h about 140 km.
	MHC	eP	03 50.2	d	
	MIN	iP	57.3	d	
	CLS	eP	58.0	d	
	PRI	eP	40.6	d	
Dec. 12	BKS	eP	23 34 49.9	c	
	MHC	eP	34 54.7	c	
	MIN	iP	42.5	c	
	CLS	eP	45.4	c	
	PRI	eP	04.2	c	
Dec. 13	MIN	iP	23 32 14.1	d	USCGS: 46.3°N, 150.5°E, 0=23 24 36.6. Kurile Islands. h about 90 km.
Dec. 14	BKS	iP	01 56 09.2	d	USCGS: 17.9°S, 178.3°W, 0=01 45 13.8. Fiji Islands. h about 550 km.
	MHC	eP	09.5	c	
	MIN	iP	19.3	d	
	CLS	eP	09.3	c	
	PRI	eP	09.5	c	
Dec. 14	MIN	iP	06 59 47.2	c	USCGS: 44.5°N, 151.7°E, 0=06 49 34.6. Kurile Islands. h about 33 km.

Date	Sta.	Phase	Ground		Remarks
			Time (GCT)	Motion	
1963			h	m	s
Dec. 14	BKS	eP	07 57 08.8	d	USCGS: 62.7°N, 149.5°W, 0=07 51 07.9. Central Alaska. h about 95 km.
		e(S)NE	08 02 00	NW	
		e(G)NE	35.5		
		e(R)NE	05.5		
	MHC	eP	07 57 14.8	d	
	MIN	iP	50.8	d	
	CLS	eP	01.4	d	
	PRI	eP	27.9	d	
Dec. 14	MIN	eZ	08 03 38.3	c	
Dec. 14	MIN	eZ	10 35 37.1	d	USCGS: 5.0°N, 82.6°W, 0=10 26 47.0. South of Panama. h about 33 km.
Dec. 15	MHC	eE	07 15 17.0	d	USCGS: 28.6°N, 129.9°E, 0=07 02 36.5. Kurile Islands. h about 33 km.
	MIN	eP	08.2	d	
	PRI	eZ	23.5	d	
Dec. 15	MIN	eZ	10 58 30.4	d	
Dec. 15	MIN	eP	11 37 49.9	c	USCGS: 39.1°N, 114.3°W, 0=11 36 24.3. Eastern Nevada. h about 33 km.
Dec. 15	BKS	eP	15 47 39	d	USCGS: 51.0°N, 128.8°W, 0=15 44 22.3. Vancouver Island. h about 33 km.
	MHC	eP	45.3	d	
	MIN	eP	04.3	c	
	CLS	eP	24.8	d	
	PRI	eP	48 05.4	c	
Dec. 15	MIN	eZ	19 52 18.0	c	USCGS: 4.8°S, 108.0°E, 0=19 34 45.5. Java Sea. h about 650 km.
Dec. 15	BKS	eP	19 52 33.7	d	BKS: 54.9°N, 159.4°W, 0=19 46 08.0. Alaska Peninsula.
		ipP	52.7	d	
		isPP	54 19.0	d	
		iPcP	55 04.3	d	
		esPP	54 20.0	d	
		i(S)NE	57 40.0	SEd	
		i(S)cP	58 56	c	
		iScSNE	20 03 10	SWc	
			mu	sec	
		PZ	2.59	10	
		SH	4.4	24	
		MaxH	25.8	36	
	MHC	eP	19 52 35.0	d	
	MIN	iP	31.3	c	
		ipP	45.1	d	
	CLS	eP	32.6	d	
	PRI	eP	37.9	d	
Dec. 15	MIN	iZ	21 28 23.5	c	
Dec. 16	BKS	eP'	02 10 29.5	d	USCGS: 2.2°S, 105.9°E, 0=01 51 44.6. Near east coast of Sumatra. h about 33 km.
		ePP	12 44	d	
		eSSNE	29.0	SW	
		e(G)N	43.9		
		e(R)E	49.8		

Date	Sta.	Phase	Ground		Remarks		
			Time (GCT)	Motion			
			h	m	s		
1963							
Dec. 16	MHC	eP'	31.2	c			
(Cont.)	MIN	eP'	28.1	c			
	CLS	eP'	28.8	d			
	PRI	eP'	34.7	c			
Dec. 16	MIN	eP	02 25 39.1	c	USCGS: 6.3°S, 105.4°E, 0=02 06 38.2. Near west coast of Sumatra. h about 33 km.		
Dec. 16	MIN	eZ	04 35 46.3	d	USCGS: 6.3°S, 105.5°E, 0=04 16 43.0. Near west coast of Sumatra. h about 63 km.		
Dec. 16	MIN	eZ	09 38 53.0	c			
Dec. 16	MIN	eZ	10 57 04.4	c	USCGS: 13.4°N, 90.9°W, 0=10 49 52.5. Near coast of Guatemala. h about 59 km.		
Dec. 16	BKS	eP	11 19 59.5	d	USCGS: 45.8°N, 142.6°E, 0=11 09 30.4. Southern Sakhalin. h about 258 km.		
	MHC		20 03.0	c			
	MIN	iP	19 51.2	c			
		ipP	52.0				
	CLS	eP	54.7				
	PRI	eP	20 12.5				
Dec. 16	BKS	eP	14 01 33.7	d	USCGS: 37.1°N, 20.9°E, 0=13 47 56.4. Ionian Sea. h about 15 km.		
	MHC	eP	36.0	c			
	MIN	iP	23.0	c			
	CLS	eP	31.3	c			
	PRI	eP	38.3	c			
Dec. 16	BKS	iP	15 29 54.4	d	USCGS: 15.2°S, 173.7°W, 0=15 18 34.8. Samoa Islands. h about 33 km.		
	MHC	eP	55.0	d			
	MIN	iP	30 05.2	c			
	CLS	eP	29 55.5	d			
	PRI	eP	54.8	d			
Dec. 16	MHC	eP	16 50 32.8	d	USCGS: 1.6°S, 78.0°W, 0=16 41 09.5. Ecuador. h about 170 km.		
	MIN	iP	42.8	d			
	CLS	eP	41.2	c			
	PRI	eP	22.2	c			
Dec. 17	MIN	eP	04 24 32.6	c	USCGS: 22.2°N, 144.4°E, 0=04 12 38.5. Volcano Islands. h about 101 km.		
Dec. 17	BKS	eP	23 28 39.00	d	USCGS: 52.9°N, 165.4°W, 0=23 22 11.2. Fox Islands. h about 33 km.		
	MHC	eP	53.3	d			
	MIN	eZ	49.2	d			
	CLS	eP	41.3	c			
	PRI	eP	29 06.3	d			
Dec. 18	BKS	iPNE	00 42 12.0	SWd	USCGS: 24.8°S, 176.6°W, 0=00 30 02.6. Tonga Islands. h about 46 km.		
		eSKSNE	52 07.5	NE			
		eSNE	19	NWc			
		iPKKP	01 00 54.8	d			
		iP'P'	08 57.5	c			

Date	Sta.	Phase	Ground		Remarks		
			Time (GCT)	Motion			
			h	m	s		
1963							
Dec. 18			mu	sec			
(Cont.)		PZ	1.88	1.0			
		SH	18.0	3			
		MaxH	70.8	10			
	MHC	eP	00 42 12.3	d			
		eS	52 18	c			
		eP'P'	01 08 54.7	d			
		eT	02 05 +				
	MIN	iP	00 42 22.8	c			
	CLS	eP	13.2	d			
		eP'P'	01 08 52.0	c			
	PRI	eP	00 42 11.6	d			
		eP'P'	01 00 57.5	c			
		eS	00 52 18	c			
		eT	02 05 37 +				
Dec. 18	BKS	eP	03 00 50.2	c	USCGS: 45.5°N, 151.3°E, 0=02 50 31.0. Kurile Islands. h about 33 km.		
		iZ	01 03.5	c			
	MHC	eP	00 54.5	d			
	MIN	iP	42.0	c			
	CLS	eP	45.3	d			
	PRI	eP	01 03.0	c			
Dec. 18	MIN	iP	06 53 28.7	d	USCGS: 41.7°N, 82.5°E, 0=06 40 05.9. Sinkiang Province, China. h about 33 km.		
		ePP	56 33.4	c			
Dec. 18	MIN	iP	10 27 52.1	d			
		i(S)	29 25.0				
Dec. 19	BKS	iP	17 14 25.6	c	USCGS: 9.7°S, 79.1°W, 0=17 04 07.8. Near coast of Central Peru. h about 56 km. Magnitude 5.3 (BKS).		
		eSNE	22 52	NW			
		eSSNE	27 00	NW			
		eLNE	33.5				
		e(R)NE	35.0				
			mu	sec			
		PZ	1.04	20			
		SH	1.64	28			
		MaxH	24				
	MHC	eP	14 21.1	c			
	MIN	eP	32.8	c			
	CLS	eP	29.9	c			
	PRI	eP	11.3	c			
Dec. 19	MIN	eP	17 43 32.5	c			
Dec. 19	BKS	iP	20 46 40.6	d	USCGS: 35.2°S, 68.0°W, 0=20 33 50.1. Mendoza Province, Argentina. h about 32 km.		
	MHC	eP	37.7	c			
	MIN	eZ	47.3	d			
	CLS	eP	43.5	d			
	PRI	eP	31.0	c			
Dec. 19	MIN	eZ	22 42 01.1	c			
Dec. 20	BKS	iP	00 36 21.7	c	USCGS: 8.6°S, 160.4°E, 0=00 23 50.2. Solomon Islands. h about 69 km.		
		e(R)	01 05.5				
	MHC	eP	00 36 23.5	c			

Date	Sta.	Phase	Ground		Remarks
			Time (GCT)	Motion	
1963			h	m	s
Dec. 20	MIN	eZ	27.1	c	
(Cont.)	CLS	eP	21.8	c	
	PRI	eP	26.3	c	
Dec. 20	MIN	iZ	04 19 43.3	d	USCGS: 45.0°N, 147.4°E, 0=04 19 15.1. Kurile Islands. h about 50 km.
Dec. 20	MIN	iZ	05 04 03.7	c	USCGS: 14.8°S, 173.4°E, 0=04 52 32.6. Samoa Islands. h about 33 km.
Dec. 20	BKS	iP	10 57 51.2	c	USCGS: 5.2°S, 80.8°W, 0=10 48 04.2. Near coast of Peru. h about 55 km.
	MHC	eP	46.5	c	
	MIN	eZ	58.8	c	
	CLS	eP	55.6	c	
	PRI	eP	36.3	c	
Dec. 20	MIN	eZ	13 02 58.2	c	USCGS: 44.9°N, 111.7°W, 0=13 00 50.7. Hebgen Lake, Montana. h about 33 km.
Dec. 20	MIN	eZ	16 43 59		USCGS: 12.7°S, 66.3°E, 0=16 24 05.1. Indian Ocean. h about 33 km.
Dec. 20	MIN	eZ	17 06 05.8	d	USCGS: 12.6°S, 66.4°E, 0=16 46 14.4. Indian Ocean. h about 33 km.
Dec. 20	BKS	eP	12 46 09.5	c	USCGS: 21.2°S, 175.8°W, 0=12 34 22.7. Tonga Islands. h about 90 km.
	eNE		13 09.0		
	MHC	eP	12 46 09.7	c	
	MIN	iZ	20.1	d	
	CLS	eP	10.6	c	
	PRI	eP	09.2	c	
Dec. 21	BKS	eE	13 35.9	E	USCGS: 16.1°N, 119.7°E, 0=13 09 09.6. Near coast of Luzon, Manila. h about 49 km.
	e(G)NE		50.4		
	e(R)NE		55.3		
	MIN	eZ	22 58.3	d	
Dec. 22	MIN	iZ	02 52 19.7	c	USCGS: 44.4°N, 114.6°W, 0=02 50 29.8. Idaho. h about 33 km.
Dec. 22	MIN	eZ	02 56 23.1		USCGS: 48.6°N, 119.9°W, 0=02 54 08.3. Northern Washington. h about 33 km.
Dec. 22	MIN	iP	05 46 35.9	d	USCGS: 44.2°N, 114.5°W, 0=05 44 38. Central Idaho. h about 33 km.
Dec. 22	MHC	eP	06 09 18.5	c	USCGS: 35.1°S, 67.9°W, 0=05 56 29.5. Mendoza Province, Argentina. h about 33 km.
	CLS	eP	23	d	
	PRI	eP	10.6	c	
Dec. 22	BKS	eP	23 23 06.5	c	USCGS: 6.9°N, 73.0°W, 0=23 13 55.2. Colombia. h about 153 km.
	MHC	eP	02.5	d	
	MIN	iZ	09.1	c	
	CLS	eP	10.0	c	
	PRI	eP	22 53.4	d	
Dec. 23	MIN	eZ	00 18 41.8	d	USCGS: 44.4°S, 114.8°W, 0=00 15 01.4. Central Idaho. h about 33 km.
Dec. 23	MIN	iP	18 50 24.2	d	USCGS: 44.1°N, 149.4°E, 0=18 39 46.6. Kurile Islands. h about 65 km.
Dec. 23	MIN	iP	22 43 23.3	c	USCGS: 12.3°N, 72.8°W, 0=22 34 22.1. Off coast of Colombia. h about 33 km.
Dec. 24	MIN	eP	02 36 15.5	d	USCGS: 45.2°N, 151.4°E, 0=02 26 01.4. Kurile Islands. h about 50 km.

Date	Sta.	Phase	Ground		Remarks
			Time (GCT)	Motion	
1963			h	m	s
Dec. 24	MIN	iP	03 11 07.5	d	USCGS: 45.4°N, 151.3°E, 0=03 00 57.3. Kurile Islands. h about 50 km.
Dec. 24	BKS	iP	03 37 55.0	c	USCGS: 45.5°N, 151.5°E, 0=03 27 23.9. Kurile Islands. h about 45 km.
	MHC	eP	59.0	c	
	MIN	iZ	40.5	c	
	CLS	eP	50.5	c	
	PRI	eP	38 07.0	c	
Dec. 24	BKS	eP	11 30 38.7	d	USCGS: 13.1°S, 166.7°E, 0=11 18 15.2. Santa Cruz Islands. h about 61 km.
	e(R)NE		56.0		
	MHC	eP	30 40.3	d	
	MIN	eZ	46.0	c	
	CLS	eP	36.5	d	
	PRI	eP	43.0	c	
Dec. 24	MIN	eZ	13 07 02.2	d	USCGS: 36.2°N, 139.7°E, 0=12 55 46.4. Honshu, Japan. h about 70 km.
Dec. 25	MIN	eZ	09 07 02.9	d	USCGS: 52.0°N, 172.1°W, 0=09 00 02.7. Andreanof Islands. h about 45 km.
Dec. 26	MIN	eZ	01 49 54.8	c	USCGS: 5.1°S, 102.3°E, 0=01 30 52. Near south coast of Sumatra. h about 40 km.
Dec. 26	BKS	eP	08 08 53.7	d	USCGS: 76.5°N, 22.4°E, 0=07 58 22.4. Svalbard region. h about 33 km.
	MHC	eP	56.4	c	
	MIN	iP	35.7	c	
	CLS	eP	48.1	d	
	PRI	eP	09 03.7	d	
Dec. 27	BKS	iP	02 38 19.1	c	USCGS: 45.7°N, 123.3°W, 0=02 36 22.3. Northwest Oregon. h about 37 km.
	MHC	eP	25.7	c	
	MIN	eP	37 43.0	d	
	CLS	eP	38 05.8	c	
	PRI	eP	43.1	c	
Dec. 27	BKS	eP	05 33 08.5	c	USCGS: 15.1°S, 175.2°E, 0=05 21 38. Tonga Island. h about 33 km.
	MHC	eP	04.8	c	
	MIN	eP	11.5	c	
	CLS	eP	04.5	d	
	PRI	eP	03.7	c	
Dec. 27	MIN	eZ	12 59 08.6	c	USCGS: 45.9°N, 151.0°E, 0=12 48 45.6. Kurile Islands. h about 33 km.
Dec. 28	BKS	eP	05 58 08.0	c	USCGS: 5.1°S, 153.5°E, 0=05 45 20.2. New Ireland. h about 70 km.
	ePP		06 01 41.5	c	
	eSNE		08.4	NE	
	e(G)N		21.0		
	e(R)E		25.0		
			mu	sec	
	MaxH		8.3	40	
	MHC	eP	05 58 11.4	d	
	ePP		06 01 36.5	d	
	MIN	eZ	05 58 29		
	CLS	eP	08	c	
	PRI	eP	12.5	d	
	ePP		06 01 16.0	c	

Date	Sta.	Phase	Ground		Remarks	
			Time (GCT)	Motion		
1963			h	m	s	
Dec. 28	BKS	iPNE	09 16	40.8	SWd	USCGS: 32.7°S, 178.9°W, 0=09 03 52.9. Kermadec Islands. h about 33 km. Magnitude 5.9 (BKS).
		e(S)NE		27.1		
		e(G)NE		39.9		
		e(R)NE		43.7		
			mu	sec		
		PZ	0.33	1.0		
		SH	2	20		
		MaxH	5	24		
		MHC	eP	16	41.0	d
		MIN	eP		49.3	d
Dec. 28	MHC	ipP		59.9	c	
		CLS		42.1	d	
		PRI		39.8	d	
Dec. 28	MIN	iP	09 34	21.6	d	
Dec. 28	MHC	eP	16 53	43.7	c	USCGS: 18.4°N, 106.0°W, 0=16 48 37. Off coast of Jalisco, Mexico. h about 33 km.
		MIN		54 08.5	c	
		PRI		53 32.3	c	
Dec. 29	BKS	eZ	03 53	0	d	USCGS: 18.8°N, 106.2°W, 0=03 41 28. Off coast of Jalisco, Mexico. h about 33 km.
		MIN		46 59.1	d	
		PRI		07	d	
Dec. 29	MIN	iP	04 16	31.0	d	USCGS: 39.1°N, 114.3°W, 0=04 15 03.8. Eastern Nevada. h about 33 km.
Dec. 29	BKS	eZ	06 34	7		USCGS: 18.6°N, 105.8°W, 0=06 22 48. Off coast of Jalisco, Mexico. h about 33 km.
		MHC		27 44.7	d	
		MIN		28 18.5	c	
		PRI		27 39.7	c	
Dec. 29	BKS	eP	17 27	10.0	d	USCGS: 18.5°N, 69.7°W, 0=17 15 39.2. Northern Chile. h about 113 km.
		eZ		36.0		
		MHC		06.5	d	
		MIN		32.9	c	
		PRI		26 58.0	d	
Dec. 30	BKS	eP	01 27	20.7	d	USCGS: 21.6°N, 144.5°E, 0=01 15 24.5. Mariana Islands. h about 120 km.
		e(R)NE		51.3		
		MHC		27 24.2	d	
		MIN		18.3	d	
		CLS		18.7	c	
		PRI		30.6	d	
Dec. 30	BKS	eP	13 39	46.8	c	USCGS: 45.5°N, 150.6°E, 0=13 29 25.3. Kurile Islands. h about 40 km.
		e(G)NE		55.6		
		e(R)		57.8		
		MHC		39 51.4	c	
		MIN		39.1	c	
		CLS		42.3	c	
		PRI		40 00.7	c	
Dec. 30	BKS	iP	13 47	27.2	c	BKS: 38°53'N, 122°31'W, 0=13 47 07.8. Clear Lake, California. h about 5 km. Magnitude 3.9 (BKS). Felt: Clear Lake area.
		MHC		36.8	c	
		MIN		35.2	d	
		CLS		13.1	d	
		PRI		58.0	d	

Date	Sta.	Phase	Ground		Remarks		
			Time (GCT)	Motion			
1963			h	m	s		
Dec. 30	MIN	eP	13 59	29.1	c	USCGS: 40.1°S, 84.3°W, 0=13 46 45.9. West of Chile. h about 33 km.	
		PRI		08.5	c		
Dec. 30	MIN	eZ	20 43	03.2	d	USCGS: 42.4°N, 142.8°E, 0=20 32 19.5. Hokkaido, Japan. h about 50 km.	
		CLS		30.4	c		
		PRI		33.8	d		
Dec. 31	MIN	iZ	04 05	06.8	d	USCGS: 45.2°N, 151.5°E, 0=10 45 17.7. Kurile Islands. h about 45 km.	
Dec. 31	MIN	iZ	10 55	26.5	d		
Dec. 31	BKS	eP'	17 56	29.5	d	USCGS: 56.5°S, 26.0°W, 0=17 37 32.1. Sandwich Islands. h about 30 km. Magnitude 6 3/4 (BKS).	
		iZ		44.0	d		
		eZ		58 12	c		
		eNE	18 12	0			
			mu	sec			
			MaxH	32	56		
Dec. 31	BKS	eP'	17 56	28.0	c	USCGS: 17.4°S, 174.2°W, 0=19 16 54.9. Tonga Islands. h about 80 km.	
		MIN		35.4	d		
		CLS		29.5	c		
		PRI		24.0	d		
		iP	19 28	21.8	c		
Dec. 31	MHC	eP		20.8	d	USCGS: 16.6°N, 99.0°W, 0=21 41 43. Guerrero, Mexico. h about 33 km.	
		MIN		33.4	c		
		CLS		21.5	d		
		PRI		20.6	d		
		eZ	21 47	34.4	c		
		PRI		29.5	d		