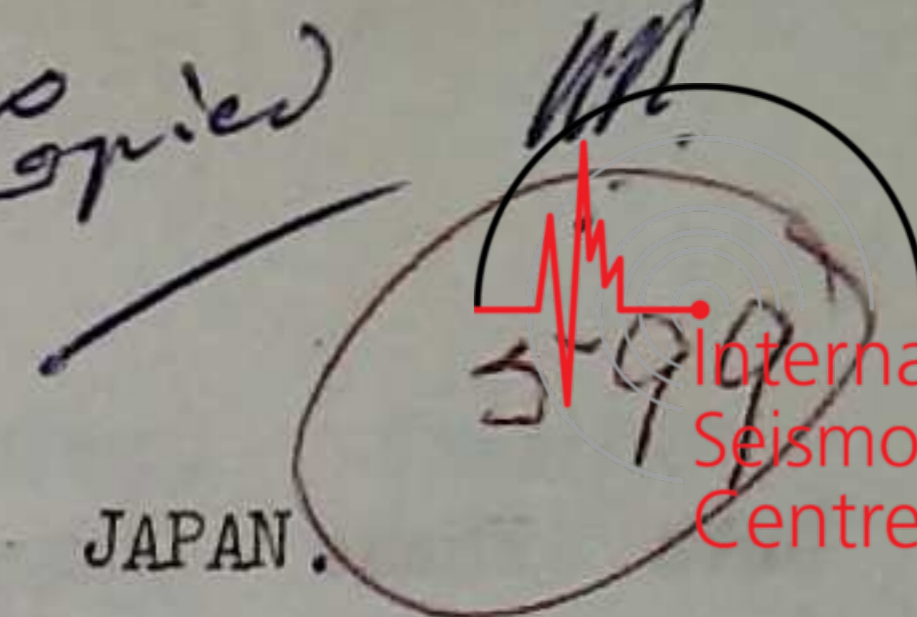


July - August 1960

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MATSUSHIRO SEISMOLOGICAL OBSERVATORY, JAPAN.

Seismological Bulletin

for July 1 to August 31, 1960

Date	Phase	Comp.	Time(GMT)			Date	Phase	Comp.	Time(GMT)		
			h	m	s				h	m	s
1.	e	E	00	01	38	1.	iP	NZ	17	18	10.8
	e	N		02	25		i	E			12.7
	e	E			30		i	NEZ			15.2
1.	iP	Z	00	05	18.2		i	E			22.7
	P:C						i	N			26.2
							i	Z			36.2
							P:N,D				
1.	iP EZ, P N		01	47	57.4	1.	P	Z	17	46	01
	i	E		48	10.9		i	N			02
	i	E			18.2		i	E			02.7
	P:W,C						ePP	N			38
1.	e	N	03	00	05		S	NE		50	31
	e	N		04	55		eL	NE		52	45
1.	iP	EZ	04	32	43.2						
	i	N			45						
	i	Z			50						
	i	N			57						
	P:W,C										
1.	eP	Z	06	23	49	1.	P	Z	22	14	30
	eL	N	07	04	17		i	E			33
	eL	E		05	00		S ?	NE		15	55
1.	iP Z, P NE		08	04	38.2		i	NEZ		16	02
	i	NEZ			41.7	1.	P	NEZ	23	29	58
	S E, eS N			09	16		i	NE		30	01
	L	NE		11	53		i	E			14.7
	P:D						iS	NE			16.7
	Mag. $5\frac{1}{2}$ - $5\frac{3}{4}$ (Mat.)					2.	iP	NEZ	00	56	18.6
	56 N., 165 E.						i	NE			36.2
	Komandorskie Is.						P:S,W,C				
	H=07 58 58										
	USCGS					2.	e	N	03	21	41
1.	eP	EZ	09	29	47	2.	iP	Z	04	36	41.7
	i	N			49		i	NE			42.2
	i	E		30	00		i	Z			56.2
1.	eP ?	Z	10	19	40		i	Z		37	14.2
	eL ?	N		34	29		ePP	NEZ		38	05
	$10\frac{1}{2}$ S., $165\frac{1}{2}$ E.						eS	NE		42	28
	Santa Cruz Is.						eLq	NE		45	16
	H=10 10 10						eLr	NE		47	55
	USCGS						P:C				
1.	iP	EZ	15	41	18.2		Mag. $5\frac{1}{4}$ (Mat.)				
	i	N			18.7		$51\frac{1}{2}$ N., 173 W.				
	i	E			44.9		Andreevanof Is.				
	eS	NE		42	25		H=04 29 30				
	P:W,C						USCGS				



2. PKP Z 09 18 05  
i Z 26  
ePP N 31 29  
eL E 10 08 47  
eL N 59  
Mag. 5 1/2 - 5 3/4 (Mat.)  
45 1/2 S., 73 1/2 W.  
Southern Chile.  
H=08 58 05 USCGS

2. P Z 10 37 24  
e NE 57 59  
2. eP Z 10 55 17  
i N 18  
i N 37

2. PKP 1 Z 12 15 39  
PKP 2 NEZ 16 12.7  
e N 40  
ePP ? N 19 00  
i N 51  
eSKKS NE 26 30  
eSKSP E 30 22  
eSS NE 39 00  
eL NE 58 25  
Mag. 5 3/4 - 6 (Mat.)  
56 S., 27 W. Sandwich Is.  
H=11 55 41 USCGS

2. iP NEZ 12 46 07.2  
i E 23  
iS NEZ 47 33  
i E 48 14  
i N 25  
ScS NE 58 10  
P:N,W,D  
41 N., 131 1/2 E. Sea of Japan.  
h: 550 km ca.  
H=12 44 21 USCGS

2. iP EZ, P N 22 00 20.7  
i E 01 11  
PP Z 36  
eS E 05 33  
eL E 08 29  
eL N 45  
P:W,C  
51 1/2 N., 175 1/2 W. Andeanof Is.  
H=21 53 22 USCGS

3. iP NEZ 09 33 59.4  
S P 34 17  
i N 18  
P:S,E,D

3. iP EZ 02 36 12.5  
S N 38  
i E 40  
P:C

3. iP EZ 03 26 30.7  
i N 31.2  
i Z 33.7  
ePP NE 27 55  
S E 32 15  
e N 21  
eL NE 34 56  
eLr Z 38.0  
P:W,C  
Mag. 5 1/4 (Mat.)  
52 N., 174 W. Andeanof Is.  
H=03 19 19 USCGS

3. P EZ 05 23 20  
i N 23.7  
i EZ 35  
eL N 31 29  
eL E 48  
P:D  
52 N., 173 W. Andeanof Is.  
H=05 16 08 USCGS

3. P EZ 07 23 26.8  
i N 27.2  
i Z 41.7  
eS E 29 13  
e N 21  
eL NE 31 59  
P:C  
Mag. 4 3/4 - 5 (Mat.)  
52 N., 173 1/2 W. Andeanof Is.  
H=07 16 14 USCGS

3. P EZ 13 16 11.7  
i NZ 12.4  
i NE 12.7  
i E 16  
i Z 17.7  
S N 18.2  
i E 19.7

3. iP NEZ 20 27 38.7  
i Z 53  
i Z 28 02.6  
PP NEZ 51  
PcP EZ 30 12  
PcP N 14  
S NE 33 09  
i EZ 56  
i E 34 55  
(cont.)

Date Phase Comp. Time(GMT)  
continued h m s  
L NE 20 35 33  
ScS NE 38 00  
P:N,E,D  
Mag. 6 1/2 (Mat.)  
50 1/2 N., 177 W. Andeanof Is.  
H=20 20 46 USCGS

3. iP NEZ 21 30 53.8  
S NE 31 07  
P:N,E,D

3. iP NEZ 22 59 16.6  
i E 23 01 46  
PcP Z 50  
PcP NE 51  
P:N,E,D  
50 1/2 N., 177 W. Andeanof Is.  
H=22 52 24 USCGS

3. iP NZ 23 48 44.6  
i E 45.1  
S E 49 59  
i N 50 01  
P:S,D

4. P NEZ 03 00 33  
i NE 38  
S NEZ 56.6

4. iP NEZ 04 10 05  
i E 07  
i N 15  
i NE 46  
i N 49  
i N 55  
36.5 N., 141.8 E.  
Near east coast of Honshu,  
Japan.  
h: 40 km ca. J.M.A.

4. iP NZ 04 39 00.1  
i E 03  
i Z 25  
ePPP E 43 15  
i N 47 15  
S N 34  
i E 45  
ScS E 49 04  
e N 52 26  
Lq N 54 35  
Lq E 39  
e N 55 34  
Lr E 56 30  
Lr Z 55  
P:S,C  
Mag. 7 (Mat.)

Date Phase Comp. Time(GMT)  
continued h m s  
52 N., 131 1/2 W.  
Queen Charlotte Is.  
H=04 28 33 USCGS

4. iP NEZ 05 02 57.8  
S NZ 03 37  
P:W,C

4. iP EZ 05 55 28.9  
i N 29.1  
S E 59  
i N 56 02  
P:W,C

4. iP NEZ 06 50 35.8  
S N 55  
i E 56  
P:S,W,C

4. eP Z 09 00 30  
52 N., 131 W.  
Queen Charlotte Is.  
H=08 51 20 USCGS

4. P Z 13 20 36.6  
i Z 21 17  
i E 38  
e E 27 35  
eS NE 29 14  
eL NE 36 01  
eL NE 37 05  
eLr EZ 39 30  
P:D  
Mag. 5 3/4 - 6 (Mat.)  
52 N., 131 W.  
Queen Charlotte Is.  
H=13 10 05 USCGS

4. iP Z 13 23 21.8  
i E 22.1  
i N 34  
S EZ 35  
P:C

4. iP NEZ 14 54 28.6  
i E 39  
i E 49  
P:N,C

4. PKP 1 Z 21 49 22  
i Z 37  
PKP 2 Z 48.6  
ePP N 53 25  
e N 22 02 55  
eSKSP E 03 46  
e E 08 21  
(cont.)



Date Phase Comp. Time(GMT)  
continued h m s  
e N 22 14 21  
e E 35  
eL N 36 15  
eL E 40 35  
eL N 59  
Mag. 5 3/4 (Mat.)  
43 S., 73 W. Southern Chile.  
H=21 39 20 USCGS

5. iP NEZ 01 32 34.1  
S NEZ 59  
P:N,E,C

5. iP Z, P N 04 58 15.6  
i E 18.1  
i E 22.1  
i Z 27  
i Z 39  
P:C

5. iP EZ 05 14 44.1  
i N 44.6  
i Z 59  
i N 15 00  
ePP E 57  
PcP Z 17 20  
eS N 20 11  
eL E 22 24  
eL N 49  
P:W,C  
51 1/2 N., 178 1/2 W. Andeanof Is.  
H=05 07 59 USCGS

5. ePKP Z 06 05 21  
eSKKS E 16 11  
eSS3 ? E 35 21  
eL E 57 17  
39 S., 73 1/2 W.  
Near coast of Chile.  
H=05 45 26 USCGS

5. iP NZ 10 49 14.9  
i E 15.3  
eS E 50 45  
e N 52  
e NE 52 24  
P:S,C

5. P NEZ 18 45 15  
S NE 46

5. iP Z 21 04 40.9  
i NE 41.1  
S NE 54  
P:D

5. ePKP Z 21 33 30  
i Z 34  
(cont.) - 4 -

Date Phase Comp. Time(GMT)  
continued h m s  
8 S., 71 1/2 W. Western Brazil.  
h:600 km ca.  
H=21 15 09 USCGS

6. iP EZ 02 43 34.7  
i N 36  
i E 44.6  
i E 56  
i Z 44 00  
P:E

6. iP NEZ 05 25 45.1  
esP ? EZ 26 47  
i Z 50  
ePPP E 28 57  
ScP Z 30 25.6  
eS NE 34 16  
eSS ? E 36 39  
eSSS E 39 14  
P:E,C

36 1/2 N., 70 1/2 E.  
Hindu Kush region.  
h:200 km ca.  
H=05 16 44 USCGS

6. e N 07 36 15  
e E 42 40  
e N 45  
e N 56 44  
e E 45

6. iP NZ 14 49 37.6  
i E 38  
i Z 50 00  
ePP N 51 13  
e E 57 42  
e N 52  
eScS ? E 59 43  
eScS ? N 47  
P:N,C

3 N., 126 1/2 E.  
Molucca Passage.  
h:200 km ca.  
H=14 43 00 USCGS

6. P NZ 17 29 07.6  
i E 08.1  
i N 19.6  
S E 30 24  
P:N,C

6. P Z 18 00 22  
i NE 23  
P:C

6. iP Z 23 23 24.6  
P:D  
39 1/2 N., 71 1/2 E. Tadzhik S.S.R.  
H=23 14 19 USCGS

Date Phase Comp. Time(GMT)  
h m s  
6. P Z 23 25 15  
i N 16  
i Z 19  
i EZ 22  
i Z 53  
ePP N 27 23  
eS E 31 40  
e N 43  
eL NE 34 59  
5 S., 125 E. Banda Sea.  
H=23 17 09 USCGS

6. P Z 23 44 18  
i NE 45 11  
5 1/2 S., 155 E. Solomon Is.  
H=23 36 04 USCGS

7. P NEZ 03 09 05  
S NEZ 20

7. P EZ 04 26 39  
i NE 27 22.6  
e N 50 24  
e N 56 33

7. P NEZ 12 59 46  
P:W,D

7. P Z 16 07 12  
i Z 24.6  
i Z 33.6  
eL N 31 25

7. eL N 17 39 15

7. ePKP ? Z 22 00 55  
eSKSP N 15 34  
e N 28 24  
eL E 23 06 14  
eL N 51

39 S., 73 W.  
Near coast of Chile.  
H=21 40 57 USCGS

8. iP EZ 01 06 44.3  
e N 08 33  
P:E,D

8. e N 01 57 27

8. P Z 02 07 54.6  
i NEZ 56.1  
i NEZ 08 32  
P:C

8. iP EZ, P N 07 45 32.6  
i NE 35  
(cont.)

Date Phase Comp. Time(GMT)  
continued h m s

i Z 07 45 37  
e N 46 08  
e N 21  
P:E,D

8. eL NE 07 56 45

8. P NEZ 08 16 05  
S Z 26  
P:C

8. iP EZ 10 16 19.1  
i N 20  
i Z 33  
e NE 17 42  
eS NE 22 00  
L E 24 41  
eL N 49  
P:E,D

52 N., 174 1/2 W. Andeanof Is.  
H=10 09 11 USCGS

8. iP NEZ 12 53 31.8  
eS Z 55 15  
i N 42  
i E 43  
i N 53  
i N 57  
i N 56 00  
i EZ 03  
P:S,W,D

Mag. 6.2 (Mat.)  
31 N., 130 1/2 E.  
Near south coast of Kyushu,  
Japan.  
H=12 51 21 USCGS

8. iP NZ, P E 14 52 53.9  
eS NE 59 15  
eL E 15 02 35  
eL N 47  
P:N,C

7 S., 129 E. Banda Sea.  
H=14 44 40 USCGS

8. iP NZ 15 33 12.6  
i E 13.6  
P:S,C

14 S., 168 E. New Hebrides Is.  
H=15 23 19 USCGS

8. iP NEZ 16 52 44.1  
eS E 58 25  
e N 40  
P:S,C



Date	Phase	Comp.	Time(GMT)			Date	Phase	Comp.	Time(GMT)		
			h	m	s				h	m	s
8.	eL	E	21	27	29	9.	iP	NEZ	16	53	42.0
	eL	N			49		i	EZ			44.6
							i	E			53.6
8.	P	Z	22	53	39		P:N,D				
	i	E			39.6	9.	iP	NEZ	18	44	42.3
	i	NEZ			48.1		i	NE			45 28.1
	i	NE	54	25			e	N	19	16	47
	S	NEZ			33		e	E			18 14
9.	iP	EZ	00	01	40.1		P:S,W,D				
	i	EZ			46	9.	e	N	20	27	28
	i	E	02	15			e	E			44
	S	N			16		e	E			31 57
	P:C						e	N			32 03
9.	eL	NE	00	32	27	9.	iP	NEZ	23	24	51.5
9.	P	NEZ	00	46	16		i	N			55
	S	NE			49 25		i	Z			25 27
	Lq	NE			50 25		eS	NE			26 09
	Lr	Z			51 10		e	NE			55
	Mag. 5 $\frac{1}{4}$ - 5 $\frac{1}{2}$ (Mat.)						P:E,D				
	25 $\frac{1}{2}$ N., 125 $\frac{1}{2}$ E. Ryukyu Is.						41.7 N., 144.5 E.				
	H=00 42 29 USCGS						Near south coast of Hokkaido, Japan. J.M.A.				
9.	iP	NEZ	01	57	55.9	10.	iP	NEZ	00	14	30.0
	eL	N	02	07	19		i	Z			41.5
	P:N,E,C						i	Z			15 01
9.	P	EZ	02	24	59.1		PcP	Z			43.5
	i	Z			25 53.6		ePP	N			16 41
	P:D						ePPP	NE			17 35
9.	P	NEZ	04	20	52		e	NE			19 21
	i	E			21 15		i	Z			39
	S	N			27		e	NE			20 59
	S	E			28		iS	NE			22 08
9.	eP	Z	07	42	05		SS	NE			25 57
	eS	E			45 13		i	E			31 25
	e	N			23		L	N			33 05
	eL	E			55		L	E			15
	eL	N			46 03		P:N,E,C				
							Mag. 6 $\frac{3}{4}$ - 7 (Mat.)				
9.	P	Z	08	17	37		0., 98 E. Off west coast of Sumatra.				
	i	Z			41		H=00 05 18 USCGS				
	eL	N			28 19	10.	iP	EZ, P N	04	07	00.9
	eL	E			29 01		S	NE			53
9.	iP	Z	08	37	04.4		P:E,D				
	i	E			23.6	10.	P	Z	08	16	44.5
	i	N			28.6		i	Z			17 01.5
	i	E			30		P:D				
9.	e	NE	09	29	01	10.	eP	Z	08	38	02
	e	N			38 58		i	NE			05
	e	E			40 05		i	N			14

Date	Phase	Comp.	Time(GMT)			Date	Phase	Comp.	Time(GMT)		
			h	m	s				h	m	s
	continued					11.	P	Z	10	51	03.8
	i	E	08	38	20		i	NE			04.3
	eS	NE			58		i	Z			22.1
	i	NE			39 01		e	N			52 41
	i	Z			02	10.	iP	NEZ	11	49	42.8
10.	iP	NEZ	11	49	42.8		i	NE			50 08.5
	i	NE			50 08.5		P:N,E,D				
10.	PP	NEZ	14	00	41.0	11.	eL	N	11	48	25
	eL ?	N			27 48		iP	EZ	12	01	31.3
	eL ?	N			29 49		i	N			32.0
	eL ?	E			53		i	Z			44.2
	12 $\frac{1}{2}$ N., 86 W.						eL	N			10 30
	Near coast of Nicaragua.						P:W,C				
	h:150 km ca.						51 $\frac{1}{2}$ N., 173 W. Andreanof Is.				
	H=13 39 55 USCGS						H=11 54 16 USCGS				
10.	iP	NEZ	19	46	15.0	11.	iP	NEZ	12	06	27.2
	i	NE			47 05		ipP	Z			07 16.6
	e	N			09		i	Z			08 54.2
	e	E			33		e	N			15 12
	P:S,W,C						eS	E			32
10.	P	Z	20	36	08.5		eL	NE			23 43
	e	E			41 55		eL	E			26 35
	e	E			21 03 51		eL	N			27 48
	e	N			04 41		ePKPPKP	Z			34 26
	P:C						P:S,E,D				
10.	iP	EZ	23	47	17.2		Mag. 5 $\frac{3}{4}$ - 6 (Mat.)				
	i	N			18.5		16 S., 172 W.				
	i	NZ			48 00		Tonga Is. region.				
	i	E			01		H=11 55 10 USCGS				
	P:W,C					11.	eP	NZ	15	04	55
11.	iP	Z	01	11	44.8		i	E			56.3
	i	E			45.0		iS	NZ			59.7
	i	N			45.5		i	E			05 00.2
	i	N			57.6	11.	e	N	16	53	13
	e	N			15 05		eL	N			17 08 13
	eL	N			17 18		eL	E			43
	P:C					12.	e	N	06	12	28
11.	eP	Z	07	46	26	12.	eP	Z	09	25	14
	e	Z			48 10		eL	N			35 53
	eS	NE			57 34	12.	eP	Z	12	15	19
	ePPS	E			59 10	12.	iP	NEZ	13	35	59.8
	eSS	N	08	03	44		iS	N			36 20.2
	eL	N			11 09		P:S,E,D				
	eL	E			12 35	12.	P	N	17	01	46.2
	54 S., 140 $\frac{1}{2}$ E.						i	EZ			47.0
	South of Australia.						i	N			47.5
	H=07 33 32 USCGS						S	NE			03 04.6
11.	e	N	09	22	54		P:S				
	e	N			58 15		41 N., 142 E. Off coast of northern Honshu, Japan.				
							H=17 00 25 USCGS				







Date	Phase	Comp.	Time(GMT)			Date	Phase	Comp.	Time(GMT)		
			h	m	s				h	m	s
14.	P	Z	11	36	50.8	14.	iP Z, P N		14	45	49.1
	i	NZ			51.8		i	EZ			49.8
	i	E			52.5		S	Z		46	22
	S NZ, iS	E	37	23			e	E			23
							e	N			26
14.	iP	Z	11	41	21.3		P:D				
	eS	NE			53						
	P:C										
14.	P	Z	12	17	36.7	14.	iP	Z	15	29	10.8
	i	E			37.8		i	NE			11.0
	i	N			38.4		eS	N		35	42
	iS	EZ	18	09			eL	N		38	30
	i	N			44		P:C				
							1 N., 120 $\frac{1}{2}$ E. Celebes.				
							H=15 21 41				USCGS
14.	eP	NZ	12	20	13	14.	iP	NZ	15	37	57.4
	i	E			13.9		i	E			57.6
	eS	E			44		i	Z		38	06.3
	i	N			45.2		i	N			21.6
14.	iP	Z	12	46	15.9		e	E			25
	i	N			16.5		i	N			39.2
	i	E			17.4		i	E		39	23.1
	eS	N			46		P:D				
	i	E			49.6						
	P:D					14.	iP	Z	16	01	28.7
14.	iP	Z	12	49	24.7		i	N			28.9
	i	N			25.0		i	E			29.5
	i	E			25.8		eS	NE		02	02
	i	E			28.4		P:C				
	iS	N			56.2	14.	iP	NZ	16	20	42.2
	i	E			57.3		i	E			43.1
	i	Z	50	02.1			P:N,C				
	P:C					14.	P	NZ	16	20	59
14.	P	Z	12	51	13.3		i	E		21	00.1
	i	N			13.9		iS	EZ			30
	i	E			15.1		i	N			32
	eS	NE			45	14.	P	Z	16	53	41.6
14.	iP	NEZ	13	38	14.6		i	E			45.3
	i	N			15.7		eS ?	N		54	14
	i	E			15.9	14.	eP	Z	17	54	44
	iS	EZ			47		i	N			45.0
	P:S,D						i	NZ			46.8
14.	P	Z	14	05	38		eS	NEZ		55	16
	i	N			39.2	14.	iP EZ, P N		18	15	40.7
	S	N	06	10.1			i	E			41.2
	e	Z			11		i	Z			45.9
14.	P	NZ	14	38	53		iS N, S E		16	10.1	
	i	E			54.7		P:E,D				
	eS	NE	39	29		14.	eL	N	19	19	19
							eL	N			25 28

Date	Phase	Comp.	Time(GMT)			Date	Phase	Comp.	Time(GMT)		
			h	m	s				h	m	s
continued						15.	iP	NEZ	15	46	37.0
							e	Z			48
							e	N			54
							i	E			59.2
							i	N		47	28.5
							P:N,W,C				
14.	iP	Z	20	26	18.1	15.	iP	Z	19	49	04.1
	i	E			20.1		i	N			04.4
	i	N			21.1		iS	E			40.6
	S	N			32 47		e	Z			43
	eL	N			35.2		P:D				
	P:C					15.	iP	NEZ	20	13	54.4
							iS	E		14	21.1
							i	N			21.3
							P:S,E,C				
						15.	iP	NEZ	22	14	20.1
							i	EZ			49
							i	N			55
							i	E		15	00
							i	N			07
							P:N,E,C				
14.	P	Z	22	24	22.7	15.	eP	Z	23	23	45
	i	NEZ			24.1		i	E			51.2
15.	e	N	00	32	24		e	Z			52
	eL	N			34 56 ca.		iS	N		24	20.0
							i	Z			22.3
							e	N			28
15.	iP	NEZ	03	00	46.7	15.	iP	N	00	35	24.2
	i	E			52.6		i	Z			24.5
	eS	N			01 12		i	N			25.9
	e	E			16		i	E			26.8
	P:S,E,D						iS	N		36	02
15.	P	Z	04	08	42.4		i	EZ			03
	i	E			42.6	16.	iP	N	01	49	40.3
	iS	Z			58.2		i	NE			42.8
	i	N			59.2		i	Z			50.5
	e	E			09 00		iS	NEZ		50	29
							i	N			38
							i	E			40
							i	Z			43
							P:D				
15.	eP ?	Z	05	15	48	16.	iP	N	03	13	10.6
	e	N			40 54		i	Z			20.3
	eL	N			47 23		i	E			20.7
	eL	E			56 02		i	NE			27.8
							i	N		14	00.4
							i	E			01.5
							P:N				
						15.	iP	EZ	10	24	07.8
							i	N			08.1
							i	N			30.6
							i	E			34.3
							P:E,D				



Date	Phase	Comp.	Time(GMT)		
			h	m	s
16.	iP	Z	04	15	39.1
	e	NE			42
	eL	N	26	25	
P:D					
16.	iP	NEZ	04	52	19.6
	i	NEZ			58.6
	P:N,E,C				
16.	iPKP	NEZ	05	04	18.9
	i	Z			29.8
	i	N			33.1
	i	Z			52.8
	i	E			59.5
P:E,D					
21 1/2 S., 67 W.					
Southern Bolivia.					
h:150 km ca.					
H=04 44 34 USCGS					

16.	P	Z	05	34	26.6
	i	E			32.7
	i	Z			34.1
	iS	N	35	01.6	

16.	iP	Z	05	46	36.1
	i	N			36.3
	i	E			37.4
	iS	Z	47	20.4	
	i	E			26.1
P:C					

16.	P	Z	06	03	08
	i	E			09.4
	i	N			10.9
	eS	NE			39
	i	Z			39.9

16.	iP	EZ	07	05	24.1
	i	N			24.8
	e	Z			35
	e	E			48
	iS ?	N			53.4
P:E,C					

16.	iP	NZ	17	21	09.8
	i	N			10.6
	i	Z			10.8
	i	E			11.4
	S	E	23	52	
	i	NZ			53
	i	Z			55
	iScP	Z	28	58.1	
	i	N	29	03.2	
	P:N,C				
Mag. 5.9 (Mat.)					
21 1/2 N., 143 E. Mariana Is. region.					
h:300 km ca.					
H=17 17 44 USCGS					

Date	Phase	Comp.	Time(GMT)		
			h	m	s
16.	iP	NEZ	18	46	47.1
	i	NEZ			52.4
	P:N,E,C				
16.	eP	Z	19	00	12
	e	E			13
	e	N			16
	e	N	08	45	
16.	eP	Z	19	17	52
	e	N			26 10
16.	eP	NZ	21	16	48
	i	EZ			53.5
	e	N	17	18	
	i	E			21.6
	i	Z			26
	i	E			36.3

16.	iP	NEZ	21	27	39.8
	i	N			29 11.4
	e	N			31 40
	eS	E			34 07
	eL	N			37 17 ca.
	eL	E			28
	eL	N	40	27	
	eL	E			31

P:N,E,D					
65 1/2 N., 167 1/2 W.					
Seward Peninsula, Alaska.					
H=21 19 37 USCGS					
16.	iP	NZ	22	10	56.3
	i	E			56.7
	i	Z	11	20.6	
	i	Z			25.4
	e	E			47
	i	NZ			49.6
	e	Z	12	14	
	eL	NE	20	45	
	eL	NE	23	49	

P:N,D					
65 1/2 N., 167 1/2 W.					
Seward Peninsula, Alaska.					
H=22 02 53 USCGS					

17.	e	N	00	17	37
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17.	eP	NZ	00	32	11
	i	E			11.3
	e	Z			41
i	NE			45.5	

17.	iP	NZ	01	16	32.0
	i	E			33.1
	i	N	17	01.5	
	iS	EZ			03.4
	P:N,C				

Date	Phase	Comp.	Time(GMT)		
			h	m	ms
17.	eP	Z	02	08	05
	i	N			12.3
	eS	N			52
	e	E			53
17.	eP	Z	02	20	50
	e	E			21 12
	i	NZ			18.5
	e	N			25 56
	e	E			26 41
	eL	N	28	09	
	eL	E			35
12 N., 125 E. Samar, P.I.					
H=02 15 07 USCGS					

17.	iP	EZ	03	56	42.8
	i	N			44.4
	i	N			51.3
	S	NZ	57	18	
	i	E			18.9
P:E,D					

17.	P	Z	04	45	50		
	17.	eP	NZ	05	23	29	
		e	Z			24 01	
		e	E			08	
		sP	N			44	
		eS	N	31	21		
		esS	E	35	45		
		esS	N	36	00		
		eL	E	37	55 ca.		
		eL	N	42	11		
		eL	E			16	
		Mag. 5 1/2 (Mat.)					
		36 N., 69 E. Hindu Kush.					
h:200 km ca.							
H=05 14 56 USCGS							

17.	iP	NEZ	07	29	19.9	
	i	Z			31.1	
	e	N			37	
	S	N			55	
	i	E			58.5	
	e	E	30	21		
	i	E	31	12.1		
	P:N,E,D					

17.	eL	N	08	00	35
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17.	iP	NZ	10	23	53.6	
	i	E			53.9	
	i	E	24	25.1		
	e	N	25	18		
	i	E			21.1	
	S ?	E			27.0	
	e	Z			28	
	i	N			28.9	

(cont.)

Date	Phase	Comp.	Time(GMT)		
			h	m	s
continued					
17.	i	Z	10	25	30.0
	eL	E			26 26
	eL	N			42
	P:S,D				
17.	iPKP	Z	12	09	16.7
	iPKP:C				
	10 1/2 N., 62 W.				
	Near coast of Venezuela.				
	h:100 km ca.				
H=11 50 15 USCGS					
17.	iP	NZ	12	18	36.9
	i	E			37.1
	i	E			19 00.6
	i	Z			15
	iS	NE			20
P:S,C					
17.	e	E	12	18	39
	e	N			46
17.	iP	Z	12	49	42.2
	i	E			44.2
	i	N			53.9
	iS	E			56.1
	i	N			58.0
P:C					
17.	iP	EZ	14	13	57.9
	i	N			58.5
	iS ?	Z	14	11.1	
	i	E			12.5
	i	N			23.1
	i	E			26.8
	i	Z			38.6
P:E,D					
17.	iP	EZ, P N	16	50	04.7
	i	Z			21.8
	S	N			27.1
P:E,D					
17.	iP	NZ	18	25	23.6
	i	E			24.3
	iS	NEZ			44.7
	P:D				
17.	iP	NZ	18	26	26.6
	i	E			27.1
	S	NE	27	14.4	
	e	Z			16
P:S,D					
17.	eP	Z	18	46	16
	e	N			56 30
	e	N	19	04	31

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Date	Phase	Comp.	Time(GMT)		
			h	m	s
17.	ePKP	Z	20	02	12
	ePP	N		05	44
	eLq	N		41	46
	eL	NE	21	00	18
10 S., 13 W. Ascension I. region. H=19 42 38 USC GS					

17.	P	NZ	21	08	06
	i	EZ			07.1
	i	Z			18.1
	i	N			20.9
	i	E			42.5
	iS	N			49.3

17.	eP	Z	22	22	05
	i	N			07.7
	i	Z			37.0
	i	E			37.6

17.	e	N	22	50	42
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17.	iP	Z	23	13	56.6
	i	N			57.3
	i	E			57.7
	eL	N		57	22
	P:C				

18.	iP	Z	01	02	47.6
	i	E			49.6
	i	Z			54.5
	i	E			55.9
	i	N			58.9
	iPcP	Z		04	16.3
	e	N			19
	eS	NE		09	55
	eSS	E		13	19
	eL	E			15.5
	eL	N			15 50
	P:C				
Mag. 5 3/4 (Mat.) Nicobar Is. H=00 53 54 USC GS					

18.	P	Z	01	24	08.6
	i	N			10.6
	i	E			16.6
	i	N			23
	eL	E		58	30
	eL	N			49
Nicobar Is. H=01 15 07 USC GS					

18.	P	NZ	01	51	15
	i	E			16.6
	i	Z			17.3
	i	NE			17.7
	iPcP	E		53	00.1
(cont.)					

Date	Phase	Comp.	Time(GMT)		
			h	m	s
continued	iPcP	Z	01	53	00.6
	e	Z		56	47
	PcS	Z			54.2
	PcS	E			55.6
	PcS	N			56.1
	e	E		59	57
	SS	N	02	00	41
	L	NE		02	31

Mag. 6 1/2 (Mat.) 4 1/2 S., 151 E. New Britain region. h:200 km ca. H=01 43 29 USC GS					
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18.	eL	N	04	27	37
	eL	E			57

18.	eS	E	04	51	11
	e	N			15
56 N., 111 E. Lake Baikal, U.S.S.R. H=04 40 54 USC GS					

18.	iP	Z	05	40	30.3
	i	NE			30.5
	iS	NE			53
	i	NE			55
P:D					

35.4 N., 140.4 E. Near east coast of Honshu, Japan. h:40 km ca. J.M.A.					
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18.	eL	N	06	30	58
	eL	E		32	26

18.	iP	NEZ	06	45	10.4
	iS	N			32.8
	e	E			37
P:E,C					

18.	eP	Z	07	58	14
	eL	N		08	16 22
	eL	E			19 28

18.	P	NZ	08	20	13
	i	E			13.8
	i	N			24.3
	eS	N			43
P:C					

18.	eL	N	10	05	21
	eL	E		08	20

18.	eP	NEZ	10	35	13
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18.	eP	Z	17	01	07
	e	N			03 58
(cont.)					

Date	Phase	Comp.	Time(GMT)		
			h	m	s
continued	eL	N	17	19	53
	eL	E			55
37 1/2 N., 70 1/2 E. Hindu Kush. H=16 51 41 USC GS					

18.	eP	Z	19	03	43
	eS	M		14	40
	eL	N		42	11
	eL	E			24
7 S., 51 1/2 E. Amirante Is. H=18 50 32 USC GS					

18.	iP	EZ	20	56	26.9
	i	N			27.3
	eS	Z		57	07
P:W,C					

19.	P	N	01	09	33
	i	Z			37.2
	i	E			38.3
	i	E		10	03.4
	i	N			05

19.	iP	NZ	01	12	11.9
	i	E			12.1
P:S,C					

19.	iP	Z	01	37	15.6
	iS	N			34.9
	i	E			35.6
	i	Z			35.9

19.	iP	NEZ	03	48	07.3
	S	NEZ			13
P:S,D					

19.	iPKP	E	04	38	22.8
	i	N			25
	i	Z			32.6
	i	Z			46.6
	PKS	Z		41	58
	eSKSP	N		51	12
	eL	E		05	22 35
	eL	N			43
	eL	N			39 05
PKP:W					

7 S., 80 W. Near coast of Peru. H=04 19 14 USC GS					
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19.	iP	NEZ	06	32	25.6
P:N,W,D					

19.	eP	Z	11	54	11
	eL	NE		12	23 50

19.	eP ?	E	14	41	14
	i	Z			24.7

Date	Phase	Comp.	Time(GMT)		
			h	m	s
19.	iP	Z	15	52	39.2
	i	NE			39.4
	S	N			53 14
P:C					

19.	iP	NZ	18	34	44.4
	i	E			44.8
	i	N			53.2
	i	E			35 04.0
	i	N			36 42.6
	eS	N			38 45
	i	E			39 12.4
	e	N			15
	eL	E			40 35
	eL	N			41 22
P:S,D					

13 1/2 N., 146 E. Mariana Is. h:100 km ca. H=18 29 31 USC GS					
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19.	iP	NEZ	19	56	59.6
	e	E			57 16
	eS	NEZ			23
	e	NE			29
P:S,E,D					

35.5 N., 141.1 E. Near east coast of Honshu, Japan. J.M.A. h:40 km ca.					
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19.	eP	NZ	22	10	52
	i	E			53.7

19.	iP	N	22	46	17.2
	i	Z			17.5
	i	E			20.3
	i	N			38.8
	i	Z			47 02.6
P:N					

20.	P	Z	00	17	08
	iS	Z			24.6
	i	E			24.8
	i	N			25.1
	i	N			34.1

20.	iP	Z, P NE	01	04	20.1
P:C					

20.	iP	NEZ	02	51	49.3
	e	N			53 01
P:N,W,C					

20.	P	EZ	03	20	06.9
	i	N			34.9



Date	Phase	Comp.	Time(GMT)			Date	Phase	Comp.	Time(GMT)		
			h	m	s				h	m	s
20.	eP	EZ	03	59	45	20.	iP	NEZ	19	53	31.4
	e	Z	04	00	06		i	Z			43.1
	i	NE			07		i	Z	54		01.3
20.	eL	NE	05	33	05 ca.		iS	NE			15.2
								P:N,E,C			
20.	iP	Z	06	11	35.2	20.	iP	NEZ	21	09	42.0
	i	NE			35.6		eS	Z	18	02	
	e	N	16	31			i	E		20	
	eL	N	18	58			i	N		24	
	eL	E	19	29			e	E	21	00	
	P:C						eL	E	25	33	
20.	eP	Z	06	33	43		eL	N	25.6		
	e	FZ		34	14		eL	N	29	55	
	e	N			16		eL	E	30	35	
	e	N		37	24			P:S,E,D			
20.	iP	NEZ	09	34	58.6			Mag. 6 <sup>1</sup> / <sub>4</sub> (Mat.)			
	i	NE			59.5			20 <sup>1</sup> / <sub>2</sub> S., 169 E.			
	i	NEZ			35.01			New Hebrides Is.			
	iS	E			38			h:200 km ca.			
	iS	NZ			34	20.	eP	Z	21	38	37
	L	N			40		e	E			47
	eL	E			33						
	P:S,W,C					20.	eP	NZ	21	54	34
	Mag. 5 3/4 - 6 (Ma.)										
	49 N., 157 <sup>1</sup> / <sub>2</sub> E.					20.	ePKP	Z	21	58	24
	Kurile Is, region.							Southern Chile.			
	H=09 30 33	USCGS						H=21 38 20	USCGS		
20.	eP	Z	11	12	24	20.	eP	Z	22	38	28
	i	N			28.3		eL	E	50	19	
20.	iP	EZ	12	44	08.6		eL	N			41
	i	N			08.8	20.	P	NZ	23	16	08.5
	iS	N			34.1		i	E			09.2
	P:W,D						eL	NE	22	12	ca.
20.	iP	NEZ	13	33	49.1	20.	eP	EZ	23	19	07
	iS	NE			53		e	NEZ			17
	P:S,F,C						e	Z	21	52	
20.	iP	NEZ	13	42	39.6	20.	iP	EZ	23	27	01.2
	iS EZ, S N				44.0		i	N			03.2
	P:N,W,D						i	E			19
20.	iP	NEZ	13	44	17.2		i	NZ			23.7
	iS	EL			21.2		iS	N			39.8
	P:N,W,D						e	NEZ			45
20.	eL	NE	19	16	29	21.	P	N	00	13	48
							i	N			14
20.	iP	NEZ	19	25	48.0	21.	iP	EZ	00	20	43.5
	i	Z			55.0		iS N, S E				21
	iS ?	N			17.5		P:E,D				11.0
	i	E			18.8						
	i	E			30						
	P:S,E,C										

Date	Phase	Comp.	Time(GMT)			Date	Phase	Comp.	Time(GMT)		
			h	m	s				h	m	s
21.	iP	Z	06	50	48.6		i	E	13	26	48
	i	E			48.9		i	Z			27
	i	N			49.1		i	NE			09
	iS	NEZ			53.0						
	P:D					22.	P	NZ	13	35	32.3
21.	P	NZ	09	55	03.5		i	E			46
	i	E			04.5		i	NZ			50
	i	N			57		i	N	36		09
	iS N, S EZ				50		i	E			12
21.	eP 1	NZ	20	53	51	22.	iP	EZ	13	58	18.5
	iP 2	Z			53.0		i	N			18.7
	i	E			54.0		i	Z			24.0
	i	N			58		i	NE			26
	iS	NEZ			55		i	E			46
	L	NE			56		i	N			55
	L	Z			57		i	NE	59		02
	P 2:D							P:W,C			
	27 N., 142 <sup>1</sup> / <sub>2</sub> E.	Bonin Is.				22.	P	NEZ	15	27	57
	H=20 51 20	USCGS					eS	E			28
							i	NZ			06
22.	P	Z	01	18	42	22.	i	NEZ	15	31	10.0
	eS ?	NE			22		i	E			31
22.	iP	NEZ	04	27	25.5		i	Z			34
	i	E			31		i	N			35
	i	NE			47		i	Z			32
	i	E			51		i	EZ			40
	iS N, S E				52.5	22.	eP	NEZ	15	36	48
	i	Z			28		i	EZ			51
	P:N,E,D						i	N			52
22.	iP Z, P N		05	54	34.7	22.	eP	NZ	19	22	53
	i	E			37.2		e	E			56
	eS	E			57		e	N			25
	e	N			26		e	E			27
	e	Z			28		eL	E			29
	P:D						eL	N			40
22.	e	N	07	23.1		23.	eP	NZ	00	12	10
22.	P	NEZ	07	39	33		eS	NE			19
	eS	N			42		eL	E			23
	eL	N			44		L	N			19
	L	E			31						21
22.	P	Z	10	15	43	23.	eP	Z	01	34	36
	e	NE			16		i	E			37.8
					03		i	N			35
							i	E			36
22.	P	NZ	12	15	44	23.	eP	Z	02	49	27
	i	NEZ			16		i	NEZ			41
					05 ca.						
22.	iP	NEZ	13	25	47.3	23.	P	NZ	02	58	18
	iS	NEZ			51.2		iS NZ, S E				59
	P:S,W,D										23.5
22.	P	NZ	13	26	46	23.	P	NZ	05	55	15
					(cont.)						





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Date	Phase	Comp.	Time(GMT)		
			h	m	s
23.	P	NZ	07	07	01.8
	i	E			02.8
	i	N			31.2
	iS	E			37.3
23.	iP	NZ	07	41	56.3
	i	E			56.7
21 1/2 S., 179 1/2 W. Fiji Is. h:600 km ca. H=07 31 38 USCGS					
23.	e	N	13	20	47
	eL	N			21 05
23.	eP	EZ	14	46	30
	e	N			35
	i	Z			37
	i	N			56
	i	E			58
23.	iP	EZ	20	43	57.2
	iS	NE			44 03.3
F:W,C					
23.	P	Z	22	45	50
	i	Z			55
	S N, eS	E			54 55
	e	N			58 51
	e	N	23	04	47
23.	iP	Z	23	55	20.2
	i	NE			20.9
	i	Z			41
	i	E			41.3
P:S,E,D					
24.	P	Z	02	33	35.3
	eS ?	N			39 44
	eL	N			41 34
P:C 50 1/2 N., 177 1/2 W. Andreanof Is. H=02 26 45 USCGS					
24.	iP	Z	03	45	50.7
	i	E			53
	i	Z			46 12
P:C					
24.	iP NZ, P E	NE	04	05	35.7
	S	NE			06 42
P:S,D					
24.	iP NZ, P E	Z	04	43	08.7
	i	Z			12
P:N,W,C					
24.	P	NZ	06	55	50
(cont.)					

Date	Phase	Comp.	Time(GMT)		
			h	m	s
continued					
	i	E	06	55	51.3
	i	E			56 19.4
	S	NZ			29
24.	e	N	08	17	33
	e	E			17.6
	i	N			21 35
24.	iP	NEZ	09	54	34.4
	i	Z			55 09
	i	Z			56 33
	S	N			59 08
	i	E			15
	iLq	E	10	01	00
	iLq	N			03
	L	Z			02 13
	Lr	Z			04.6
P:S,W,C Mag. 6 1/2 - 6 1/2 (Mat.) 56 N., 164 E. Near coast of Kamchatka. H=09 48 56 USCGS					
24.	eP	NZ	20	44	32
	i	E			33
	i	NEZ			42.5
	S	NEZ			45 31
24.	P	Z	23	56	26
	i	NE			28.1
	i	E			59 19
	i	NZ			24
25.	P	Z	01	20	20
25.	iP I,N, P 1	EZ	03	46	34.5
	P 2	NEZ			38.6
	S	NEZ			51 03
	Lq	N			52.1
	Lq ?	Z			52 11
	iLr	N			53 35
	iLr	E			43
	Lr	Z			56 05
	L	N			35
	L	E			57 00
P 1:S,W,C P 2:N,E,D Mag. 6 1/2 (Mat.) 55 N., 163 E. Near coast of Kamchatka. H=03 41 05 USCGS					
25.	P	Z	04	19	29
	i	NE			30
25.	P	NEZ	05	43	05

Date	Phase	Comp.	Time(GMT)			Date	Phase	Comp.	Time(GMT)		
			h	m	s				h	m	s
25.	iP Z, P NE		10	37	12.5	continued					
	P:N,W,C						eL	E	13	17	21
	17 1/2 S., 178 W. Fiji Is.						P:D				
	h:500 km ca.						40 1/2 N., 37 E. Turkey.				
	H=10 27 00 USCGS						H=12 36 20 USCGS				
25.	iP 1	NZ	11	16	53.3	26.	iP	NEZ	14	21	25.0
	iP 2	NEZ			56.0		i	Z			36
	iS	NEZ			20 49.0		iS	NE, S Z			46.7
	L	N			22 41		P:S,E,D				
	L	E			45	26.	P	Z	14	49	20.9
	L	Z			27.1		i	N			22.0
	iScS	N			27 54		i	E			45.3
	iScS	E			56.0		iS	NZ			45.7
	i	Z			28 09.4		P:D				
P 1:N,D P 2:S,W,C Mag. 7 1/2 (Mat.) 54 N., 159 E. Kamchatka. h:100 km ca. H=11 12 00 USCGS						26.	P	NZ	15	01	47.4
25.	P	NEZ	11	24	10		i	E			50
25.	P	Z	12	00	14		S	NEZ			02 12
							P:C				
25.	iP NZ, P E		15	35	28.6	26.	iP	NEZ	16	12	31.7
	S E, eS NZ				39 23		iS	NEZ			41.3
	P:N,D						P:N,E,C				
	53.4 N., 159.4 E.					26.	iP	NEZ	16	35	54.4
	Near coast of Kamchatka.						S ?	E			37 15
	h:152 km ca.						i	N			19
	H=15 30 36.6 USCGS						P:N,E,D				
25.	P Z, eP N		21	44	28	26.	P	NEZ	20	54	02.5
	i	E			34		iS	NEZ			11.5
	e	NE			47 15		P:C				
	i	NE			54 28	26.	iP	EZ	21	29	02.9
	L	N			56 34		i	N			03.0
	L	Z			46		S	N			14
							i	Z			14.9
							P:E,C				
25.	P	EZ	21	47	48.3	27.	P	Z	02	38	47
	iS	NEZ			50.4	27.	eP	Z	03	28	27
							i	Z			34
							i	NE			36
26.	iP	NEZ	03	57	26.3		i	E			31 47
	i	Z			58 37		S ?	E			55
	S	NE			42		e	N			55
	L	N			59 05		L	NE			32 43
P:S,W,C Mag. 5 (Mat.) 40 1/2 N., 144 1/2 E. Off east coast of Hokkaido, Japan. H=03 55 54 USCGS						27.	eP	Z	07	59	51
26.	P	Z	12	48	01		i	EZ	08	00	00
	e	N			06.1		i	Z			12
	eL	N			17 00	27.	P	NZ	09	05	31.1
					(cont.)		i	Z			32.1
					(cont.)		eS	NE			13 27
					(cont.)		eSS	E			17 13
					(cont.)						(cont.)



Date	Phase	Comp.	Time(GMT)			Date	Phase	Comp.	Time(GMT)		
			h	m	s				h	m	s
continued	eSS	N	09	17	33	27.	P	NEZ	23	34	06.8
	L	N		22	05		i	E			43
	eL	E		22.1			P:N,E,C				
	P:D					28.	P	Z	01	29	55.0
	5.6 S., 103.6 E.						i	N			55.4
	Near coast of Sumatra.						i	E			56
	h:93 km ca.						i	Z	30	50	
	H=08 56 22.9	USCGS					P:D				
27.	ePKP 1	Z	10	24	46	28.	iP	NEZ	05	17	24.9
	i	NEZ			53		iS	NEZ			45.1
	i	Z		25	03		P:N,W,C				
	PKP 2	E			15	28.	e	N	07	23	55
	PP	EZ		28	31						
	i	E		30	45	28.	P	NZ	08	34	56
	SKSP	E		38	53		i	E			56.5
	SKSP	N		39	02		i	Z			57.0
	i	NE		41	52		i	EZ		35	08.1
	SS	N		48	16		S ?	N		36	17
	SS	E			53		i	EZ			33
	eSSS ?	E		53	15		i	N			38
	SSS	N			23	28.	P	NZ	09	55	06 ca.
	Lq	E	11	06.1			i	E			07
	Lq	N		07.1			i	N		56	35
	Lr	N		14	37		i	Z			47
	Lr	Z			45	28.	iP	EZ	10	20	39.7
	Lr	E			49		i	N			39.9
	eW 2	N		44.1			iS	NEZ			51.0
	Mag. 6 1/2 - 6 3/4 (Mat.)						P:E,D				
	44.7 S., 75.1 W.					28.	iP	NEZ	10	45	16.0
	Near coast of southern Chile.						P:N,W,C				
	h:25 km ca.					28.	P	NZ	14	46	48.0
	H=10 04 53.0	USCGS					i	E			48.3
27.	iP	NZ	14	17	49.3		e	N		53	53
	i	E			49.9	28.	P	NZ	14	46	48.0
	S	E		24	01		i	E			48.3
	P:N,C						e	N		53	53
	5.5 S., 147.3 E.					28.	eP	Z	16	42	40
	Bismarck Sea.						L	N			56.1
	h:205 km ca.						L	E			57.1
	H=14 10 06.6	USCGS				28.	P	NEZ	18	31	05 ca.
27.	eP	EZ	17	21	22		eS ?	E		35	57
	i	NEZ			23.2		eL	NE			38.1
	i	Z			45	29.	P	N	00	34	41.2
	S	E			46		i	Z			42.0
	i	N			48.3		i	E			43.8
	i	Z			51		i	E		36	45
							S	N		43	11
27.	P	Z	21	12	55		i	E			21
	i	N			59		i	E			54
	28.7 S., 176.7 W.						i	NE			
	Kermadec Is.										
	h:68 km ca.										
	H=21 01 06.9	USCGS									

Date	Phase	Comp.	Time(GMT)			Date	Phase	Comp.	Time(GMT)		
			h	m	s				h	m	s
continued	i	N	00	45	58	29.	P	Z	16	13	28
	i	E		46	05		i	N			29
	Lq	N		50	39		i	E			30
	Lq	E			43	29.	P 1	NZ	17	32	54.1
	L	Z		53.1			i	E			54.3
	Mag. 6 1/2 (Mat.)						iP 2	NEZ			55.0
	19 1/2 S., 170 1/2 E. Loyalty Is.						S	NE		34	02
	H=00 24 06	USCGS					ePKPPKP	Z	18	12	00
29.	eP	Z	01	03	41		W 2	Z	20	28.1	
29.	iP EZ, P N	NEZ	02	21	18.8		P 1:S,C				
	iS	NEZ			21.6		P 2:W,C				
	P:W,D						Mag. 6 3/4 - 7 (Mat.)				
29.	eP	NEZ	09	24	52		40.1 N., 142.3 E.				
	iS N, S Z			25	31.7		Honshu, Japan.				
	i	E			31.8		h:50 km ca.				
	i	Z			41		H=17 31 39.5	USCGS			
29.	P	EZ	10	50	35.9	29.	P	Z	17	53	35.2
	i	N			36.6		P:D				
	i	NEZ			45	29.	P	NEZ	18	03	26.3
	PcP	EZ		52	33		P:S,W,C				
	S	NE		56	47	29.	P	Z	18	42	08.1
	e	N	11	00.1			i	NEZ			08.4
	L	N		02	37		eS ?	N		43	25
	L	E		04.1			P:D				
	P:E,C					29.	P	N	19	19	39
	Mag. 5 1/2 (Mat.)						i	Z			39.1
	26.9 N., 90.3 E. India.						S ?	N		20	55
	h:11 km ca.						i	Z			21 31
	H=10 42 44.6	USCGS				29.	P	NEZ	20	23	23
29.	P	Z	13	36	12		i	E			24 22
	eS	N		44	57		i	N			39
	eL	NE		52.1			i	NZ			43
29.	P	EZ	14	00	41.2	29.	P	NEZ	20	23	23
	iS	NEZ			48.7		i	E			24 22
29.	P	EZ	14	43	31.8		i	N			39
	eS	N		51	15		i	NZ			43
	e	E		55.1		29.	P	NZ	23	12	02
	e	N		55	29						
	e	E		58.1		30.	eP	Z	01	29	26
	L	NE	15	04.1			i	NE			28
	L	N		07.1			iS NE, S Z				42.7
	L	Z		07 52		30.	iP	NEZ	04	07	32.8
	P:E,C						S	E			50.0
	Mag. 5 3/4 ca. (Mat.)						i	NZ			55.0
	31.7 N., 67.0 E.						P:S,W,D				
	Eastern Afghanistan.					30.	P	Z	06	21	18
	h:64 km ca.						i	Z			51
	H=14 33 46.1	USCGS				30.	P	EZ	06	33	45.7
29.	P	NEZ	15	38	05 ca.		i	N			46
	i	EZ			10.4		e	N			37 21



Date	Phase	Comp.	Time(GMT)			Date	Phase	Comp.	Time(GMT)		
			h	m	s	continued			h	m	s
30.	P	NEZ	10	47	07.7		S	NE	01	37	03
	S	NE			35		P:C				
	i	Z			42						
30.	P	Z	14	12	06.6	31.	P 1	Z	03	03	49.9
	i	N			06.8		i	NZ			50.8
	i	E			07.2		iP 2	NZ			51.6
	S	E	16	38			i	E			51.8
	i	N			40		PP	N	05	29	
	L	NE	18	28			i	NEZ			43
	L	Z	20	23			PPP	N	06	12	
	P:C						i	EZ	08	43	
30.	iP	NEZ	14	18	12.1		S	N	10	29	
	i	E			41		i	Z			37
	eL	NE	24	42			i	E			41
	L	Z	25	52			i	N	13	25	
	P:S,W,C						i	N			30
	Mag. 5 1/2 - 5 3/4 (Mat.)						i	Z			35
	56.3 N., 163.9 E.						i	E	14	22	
	Near coast of Kamchatka.						i	E	15	19	
	h:21 km ca.						i	Z			23
	H=14 12 35.5	USCGS					Lr	Z	17	05	
							Lr	N			18
							Lr	Z			29
							L	E	19	01	
30.	eP	Z	14	22	28		P 2: S,D				
	i	NE			29		Mag. 7 (Mat.)				
30.	iP Z, P	NE	14	48	55.7		5.6 S., 150.0 E.				
	i	Z			21		New Britain.				
	i	E			23		h:25 km ca.				
	P:N,E,C						H=02 55 46.2	USCGS			
30.	P	NZ	17	23	16.2	31.	eP	Z	03	09	28
	i	EZ			16.7		i	N			30
	i	E			16		i	E			35
	e	NE	24	16			i	Z			48
	i	N			21						
	i	Z			29	31.	eP	NEZ	07	12	38
	i	N			38		i	Z			39.9
	i	E			39		S	NE	19	25	
	i	E			47		i	NE	21	57	
	i	N			55		i	Z	23	31	
	P:S,C						i	E			59
30.	iP	NEZ	21	46	14.3		Lr	Z	25	41	
	iS Z, S	NE			26		Lr	N			53
							Lr	E	27	57	
30.	iP EZ, P	N	23	30	45.1		Mag. 6 1/2 (Mat.)				
	S	NZ			31		6.0 S., 150.0 E.				
	i	NE			10.8		New Britain I.				
	P:E,D						h:93 km ca.				
							H=07 04 37.1	USCGS			
31.	iP	NEZ	00	34	55.3	31.	P	Z	08	28	01
	P:N,E,D						i	NE			01.4
							S	NZ			24.3
31.	P	NEZ	00	43	53						
31.	P	EZ	01	35	41.9	31.	iP	Z	09	25	55.7
	i	N			42.2						

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Date	Phase	Comp.	Time(GMT)			Date	Phase	Comp.	Time(GMT)		
continued			h	m	s	continued			h	m	s
	i	NE	09	25	55.9		i	E	19	03	04
	P:D						i	N			16
	6.5 S., 129.6 E. Banda Sea.						i	NE			56
	h:83 km ca.						L ?	E			05 45
	H=09 17 57.4	USCGS					L ?	N			59
							L	Z			06 09
31.	iP	NZ	10	56	11.3						
	i	E			12.0						
	i	E			30						
	i	Z			33.3						
	i	E			37						
	S	NZ			39	31.	iP Z, P	NE	22	36	03.0
	P:S,D				55		i	NE			45
							P:S,W,D				
31.	P	EZ	12	23	23.2	31.	P	Z	22	38	00
	i	N			24.2		eL	NE	23	03	14
	eS	NE			52						
	i	Z			57						
31.	iP	NEZ	13	46	49.9						
	S	NE			47						
	i	E			52.3						
	P:S,W,C										
31.	PKP	Z	15	14	53.7						
	i	NE			58						
	i	EZ			15 07						
	i	N			09						
	i	Z			25						
	i	N			34						
	PP	E			18 40						
	pPP	N			19 18						
	i	E			25 45						
	SKSP	N			28 55						
	SS	N			38 20						
	SS	E			39 05						
	SSS	E			43 15						
	SSS	N			44 13						
	i	E			50.1						
	eLq ?	E			56.4						
	Lr	NE	16	05	18						
	Lr	Z			23						
	PKP:C										
	Mag. 6 (Mat.)										
	43.6 S., 74.3 W.										
	Near coast of central Chile.										
	h:97 km ca.										
	H=14 55 03.3	USCGS									
31.	P Z, eP	NE	18	14	02						
	i	E			08						
	S	NEZ			25						
31.	P	EZ	18	53	53						
	eS	E			59 57						
	i	N	19	00	17						
	i	E			35						

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August Date	Phase	Comp.	Time(GMT)		
			h	m	s
1.	P	Z	02	31	52.0
	i	Z		32	07
	eS	N		40	59
	L	NE		56	19
Mag. 6 (Mat.) 27.9 N., 54.2 E. Southern Iran. h:110 km ca. H=02 20 52.4 USCGS					
1.	iP	NZ, P E	04	56	59.9
	i	E		57	23.4
	eS ?	E		58	31
P:N,D					
1.	P	NZ	09	59	01.1
	i	Z			13
P:N,C 5.4 S., 131.0 E. Banda Sea. h:85 km ca. H=09 51 11.9 USCGS					
1.	iP	NEZ	12	41	34.3
	S	E		42	35
	i	Z			39
	i	N			50
P:S,W,C 39.9 N., 142.3 E. Near north coast of Honshu, Japan. h:70 km ca. J.M.A.					
1.	P	Z	14	46	43
	i	E			45
	i	Z			46
1.	P	Z	16	33	52.5
	i	E			57
	i	N			35 29
P:D					
1.	P	Z	16	36	53
	i	Z			54
4.8 S., 152.6 E. New Britain. h:77 km ca. H=16 28 55.0 USCGS					
1.	iP	NZ	18	32	17.4
	i	E			17.7
	S	N			26.6
P:C					
1.	P	Z	18	45	01
1.	eP	Z	19	34	35 ca.
	e	Z		35	09 ca.
	e	NE			45 ca.

Date	Phase	Comp.	Time(GMT)		
			h	m	s
1.	P	Z	20	19	37
	i	E			38
	i	N			55
	eS	N		21	30
1.	iP	EZ	20	59	22.0
	i	N			45
	i	Z			49
	eS ?	E		21	00 45
P:W,C					
1.	P	NZ	21	58	40.5
	i	NE			41.0
	e	N		22	00 22
	S	E			30
	eL	NE			55
	e	N		01	15
P:N,C 27.7 N., 142.5 E. Bonin Is. h:28 km ca. H=21 56 24.2 USCGS					
2.	P	NEZ	01	24	44.6
	i	N			46.1
	e	N		25	13
	S	N			24
	i	N			53
P:W,D					
2.	iP	NEZ	01	30	21.0
	iS ?	E			56
P:S,E,D					
2.	iP	NEZ	05	18	03.0
	ePP	Z			20 27
	S	N			26 34
	ScS	E			27 25
	i	N			56
	eSS	N			31 25
	Lq	E			34 27
	Lr	Z			38 40
	Lr	N			45
	Lr	E			55
	PKPPKP	Z			46 37
P:N,W,C Mag. 6 1/2 - 6 1/2 (Mat.) 22.2 S., 171.5 E. Loyalty Is. h:108 km ca. H=05 07 22.1 USCGS					
2.	iP	NEZ	06	21	33.0
	i	Z			49.0
	iPcP	Z			24 09.0
P:S,W,C 51.5 N., 178.3 W. Andreanof Is. h:34 km ca. H=06 14 47.1 USCGS					

Date	Phase	Comp.	Time(GMT)		
			h	m	s
2.	P	Z	09	42	18
	i	NEZ			18.5
	i	N			43 08
	eS	E			52 05
	i	N			15
	eL	E	10	02	52
	L	E			07 36
	e	Z			09 39
P:C Mag. 5 3/4 (Mat.) 28.2 S., 176.6 W. Kermadec Is. h:61 km ca. H=09 30 26.5 USCGS					
2.	P	NEZ	10	18	11
28.4 S., 176.8 W. Kermadec Is. h:92 km ca. H=10 06 25.3 USCGS					
2.	P	NEZ	10	49	53.4
	i	Z			57
	iS	NE			50 03
P:N,D					
2.	P	Z	10	52	10.2
	i	E			26
P:C					
2.	esSS	NE	14	17	50 ca.
	e	N			29 50
	L	E			34 39
Mag. 6 (Mat.) 4.5 S., 104.7 W. Southwest of Galapagos. Is. h:93 km ca. H=13 42 28.2 USCGS					
2.	eP	Z	21	00	54
	e	E			15 52
	eL	E			24 05
	eL	N			40
84.2 N., 2.3 E. North Polar region. h:40 km ca. H=20 51 03.8 USCGS					
3.	P	Z	01	13	21.7
	i	N			24.3
	i	E			40.8
	eS	N			16 27
	e	N			17 59
	L	NE			20 38
P:C					
3.	e	E	02	49	20

Date	Phase	Comp.	Time(GMT)		
			h	m	s
3.	iP	NEZ	04	53	16.0
	S	N			56
P:N,W,C					
3.	iP	NEZ	08	27	07.0
	S	NE			35.0
	i	E			46
P:S,D					
3.	P	Z	11	04	01.7
	i	E			02.6
	S	N			31
P:C					
3.	eP	E	11	48	29
	e	Z			32
3.	eP	NZ	12	04	03
	i	NZ			04
	iS	E			40.5
3.	iP	NEZ	12	10	26.9
	S	E			11 31
	i	N			45
P:S,W,C 40.2 N., 142.4 E. Near north coast of Honshu, Japan. h:40 km ca. J.M.A.					
3.	iP	NEZ	12	19	06.5
P:S,W,C					
3.	iP	NEZ	13	02	19.0
	iS	E			35.0
	i	Z			45.0
P:N,W,C					
3.	P	NZ	13	19	48.5
	i	E			49.5
	i	E			52.5
	S	E			20 12.5
P:N,C					
3.	P	Z	21	07	36.7
	i	E			37.1
	S	N			48.1
	i	EZ			49.1
P:C					
3.	P	Z	21	57	00
	e	Z			58 40
	eL	N			22 10 39
	eL	E			12 52
4.	iP	NEZ	02	34	04.1
	S	N			23.5
P:N,W,C					



Date	Phase	Comp.	Time(GMT)		
			h	m	s
4.	P S	Z N	03	00	53
				01	11.6
4.	P S	Z NE	06	38	38
				54	
4.	iP PP S L ScS	NEZ Z NEZ N E	07	41	19.9
				42	23.6
				46	23.1
				49	16
				51	50
					P:S,W,C
					Mag. 6 3/4 (Mat.)
					51.4 N., 179.1 E. Rat Is.
					h:83 km ca.
					H=07 34 53.8 USCGS
4.	P	E	07	44	12
4.	P	E	07	47	56
4.	P i i	Z E E	09	15	00.2
					00.7
					12
					P:C
					51.0 N., 179.4 E. Rat Is.
					h:100 km ca.
					H=09 08 36.2 USCGS
4.	P i S	NEZ N NE	10	11	59.1
				12	17
					27
					P:S,E,D
4.	P i P:C	Z E	11	35	48.3
				36	02
4.	iP i i	NEZ E N	11	58	08.7
					26
				59	26
					P:S,W,C
4.	P i i S eL	NEZ Z E E E	14	11	56.5
				12	07.7
					22
				17	14
				19	30
					P:S,W,C
					51.3 N., 178.8 E. Rat Is.
					h:59 km ca.
					H=14 05 28.2 USCGS
4.	P i i	EZ NZ E	15	22	54.7
					56.4
					57.6

Date	Phase	Comp.	Time(GMT)		
			h	m	s
4.	P i S i	Z NE N E	19	51	04.7
					05.1
					24.7
					25.4
					P:C
4.	P i eS	NEZ E E	21	23	21.9
					34
				24	39
					P:S,W,C
					42.7 N., 142.5 E.
					Hokkaido, Japan.
					h:110 km ca. J.M.A.
5.	eP e eL	Z N N	04	48	12
				49	47
				50	20
5.	iP i i iS P:N,C	NZ E Z NE	08	19	19.7
					20.2
					22.7
					55.2
5.	iP i iPP S i i L	NEZ E Z NE N E E	16	10	58.4
				11	16
					19
				14	30
					38
					45
				16	38
					P:S,W,C
					50.1 N., 156.8 E.
					Off south coast of Kamchatka.
					h:42 km ca.
					H=16 06 33.4 USCGS
5.	P P:S,W,D	NEZ	16	35	08.2
					9.5 S., 118.8 E. Sumba Is.
					h:64 km ca.
					H=16 26 23.5 USCGS
5.	iP i S P:S,W,C	NEZ N NE	20	52	41.7
					53
					59
5.	P i S SS Lr i	NEZ Z E NE N N	22	34	05
					17.2
				39	20
				41	32
				42	00
				43	22
					Mag. 5 3/4 (Mat.)
					51.0 N., 178.7 E. Rat Is.
					h:15 km ca.
					H=22 27 34.2 USCGS

Date	Phase	Comp.	Time(GMT)		
			h	m	s
6.	iP Z, P E i i S i P:D	Z, P E N Z N N	00	11	18.7
					20.2
					23
					48
			12	00	
6.	iP i S i P:N,W,C	NEZ Z E N	03	07	58.1
				09	31.7
					34
					35
					P:N,W,C
					27.9 N., 139.0 E.
					Bonin Is. region.
					h:583 km ca.
					H=03 05 56.4 USCGS
6.	eP i i eL eL	Z NE Z E E	13	11	36
					43
					44.7
				17	18
				21	45
6.	PKP i e PSPS L L	Z Z N W E N	15	09	43
					56.6
				12	48
				34	21
			16	00	35
				08	55
					42.4 S., 74.8 W.
					Near coast of Chile.
					h:35 km ca.
					H=14 49 44.9 USCGS
6.	P i S i	NEZ N E NEZ	16	48	40.5
					47.4
				49	09.7
					11.7
					P:E,C
6.	eP e	Z Z	17	53	44
					56
7.	P i S i	Z N NE E	00	10	52
					54.0
				11	47
					59
7.	iP S i i i	NEZ NE E NE N	03	20	04.0
				21	15
					25
				47	
				22	00
					P:S,W,C
					40.7 N., 143.5 E.
					Off east coast of Honshu,
					Japan.
					h:60 km ca.
					H=03 18 37.3 USCGS
7.	P S	Z E	09	45	50
					47 26
7.	P S	NZ NE	10	04	04.9
					51.8
					P:S,C
7.	eP	Z	12	45	31
7.	P i P:S	N EZ	21	44	27.5
					28.0
7.	eP i i	Z Z N	22	32	32
					45
					33 15
					50.8 N., 179.0 E. Rat Is.
					h:92 km ca.
					H=22 26 08.2 USCGS
8.	iP i i	EZ Z E	01	25	01.2
					09.4
					10.2
					P:W,C
					55.5 N., 166.3 E.
					Komandorskie Is.
					h:38 km ca.
					H=01 19 18.7 USCGS
8.	P i S	Z N N	07	37	56.3
					38 14.5
					20.8
					P:C
8.	eP e e	Z N E	09	17	56
					26 02
					28 08
8.	P i P:D	Z NE	10	02	20.8
					21.3
8.	eP e e L L	Z N N N E	12	40	54
				13	04 11
					11 57
				15	23
					33
					Mag. 5 1/2 - 5 3/4 (Mat.)
					12.0 N., 44.4 E.
					Gulf of Aden.
					h:24 km ca.
					H=12 28 10.2 USCGS
8.	P i S	Z Z NE	18	14	19.8
					21
					15 46



Date	Phase	Comp.	Time(GMT)	Date	Phase	Comp.	Time(GMT)	Date	Phase	Comp.	Time(GMT)	Date	Phase	Comp.	Time(GMT)	
			h m s				h m s				h m s				h m s	
8.	P	Z	21 58 04.5	9.	P	NEZ	14 05 13.8	10.	iP	NEZ	10 08 49.2	11.	iP	NEZ	06 24 09.3	
	i	Z	13.7		e	E	07 50		i	N	51		e	N	25 13	
	S	N	34		eL	N	09 28		S	E	09 13		i	E	15	
	P:D				P:W,C				i	NEZ	15.3		e	E	22	
9.	iP Z, P E		06 27 27.1		47.5 N., 142.7 E. Sakhalin.				P:N,E,C				i	NE	28	
	S	NE	32 00		h:35 km ca.								i	N	35	
	Lq	NE	33 47		H=14 02 39.3	USCGS		10.	iP	NEZ	10 27 38.3		P:S,W,C			
	Lr	E	34 58	9.	P	NZ	15 48 47.5		S	NEZ	56.3	11.	P	NEZ	15 53 08.6	
	P:S,W,C				i	N	48.2		i	Z	28 02.1		i	E	09.2	
	Mag. 5 1/2 (Mat.)				i	N	50.0		P:S,E,D				eS	Z	26	
	56.1 N., 164.2 E.				i	N	49 00.9		10.	eP	Z	10 33 36		i	NE	36
	Off east coast of Kamchatka.				S	E	05		9.4 S., 119.0 E.				P:S,E,D			
	h:10 km ca.				i	N	06.7		Sumba Is.							
	H=06 21 46.9	USCGS			P:N,C				h:31 km ca.			11.	P	Z	20 03 17	
9.	PKP	Z	06 29 52.7	9.	P	Z	16 57 55		H=10 24 46.8	USCGS			i	NE	17.7	
	PKP:D				PP	E	17 00 28		10.	iP NZ, P E	14 47 44.9		i	N	04 11.2	
	21.2 S., 71.6 W.				S	NE	07 15		P:N,C				i	Z	16	
	Off coast of Chile.				SS	E	12 13		11.	P	EZ	02 32 55.7	11.	P	NZ	20 12 16
	h:101 km ca.				SSS	NE	15 41		i	NEZ	33 04.8		i	E	16.2	
	H=06 10 11.0	USCGS			Lq	NE	16 55		i	E	17.8		i	E	47.6	
9.	P	Z	07 03 42.2		Lr	Z	20 58		11.	e	Z	18.2	11.	e	N	20 50 13
	i	NEZ	43.1		Mag. 6 1/2 - 6 3/4 (Mat.)				11.	iP	NEZ	02 43 49.7	11.	P	Z	22 58 58
	PP	Z	04 37		24.5 S., 177.1 W.				i	Z	44 19.4		i	NEZ	58.7	
	S	E	07 41		Tonga Is. region.				i	Z	36					
	i	N	56		h:186 km ca.				P:N,E,D			12.	e	E	10 38.4	
	Lq	E	09 40		H=16 46 37.7	USCGS			52.2 N., 176.2 W. Andreevanof Is.				e	NE	46.5	
	Lr	N	11 15	9.	P	Z	18 26 34.1		h:97 km ca.			12.	P	Z	13 13 12	
	P:C				i	Z	46.7		H=02 36 56.5	USCGS			i	EZ	12.7	
	Mag. 5 1/2 - 5 3/4 (Mat.)				P:C				11.	iP	NEZ	03 00 46.2		i	N	13.8
	56.1 N., 164.2 E.				9.	P	NZ	23 46 15.3		i	Z	01 36		i	E	20
	Off east coast of Kamchatka.				i	Z	47 00		ePP	Z	02 33		i	E	25	
	h:37 km ca.				S	N	53 41		e	N	03 10		e	E	33	
	H=06 58 05.5	USCGS			sS	E	54 10		eS	E	06 44		i	N	48	
9.	P	Z	07 50 36		SS	N	57 33		e	N	55		e	N	50	
	i	Z	42.6		i	E	58 28		eL	N	09 05		i	E	59	
	S	N	59 54		Lq	E	59 19		L	E	28					
	i	E	08 00 00		Lr	E	00 02 46		P:N,E,C							
	iScS	E	23		P:N				0.0 N., 121.6 E. Celebes.							
	SS	E	04 15		Mag. 5 1/2 - 5 3/4 (Mat.)				h:46 km ca.							
	SSS	E	07 32		11.5 S., 166.3 E.				H=02 53 16.3	USCGS						
	SSS	N	37		Santa Cruz Is.				11.	P	NEZ	04 49 56.9	12.	P	Z	16 17 03.7
	Lq	N	09 02		h:80 km ca.				11.	iP NZ, P E	04 56 31.2		i	Z	08	
	Lr	Z	12 13		H=23 36 51.5	USCGS			iPcP	Z	59 37.2		i	Z	13	
	Mag. 6 1/4 - 6 1/2 (Mat.)				10.	P	Z	01 43 16		S	NE	05 01 12		e	N	22 32
	40.0 N., 126.6 W.				i	E	40		eL	E	02 32		P:C			
	Off coast of northern California.				e	Z	45 25		L	N	03 03					
	h:25 km ca.				P:C				eL	N	04.4		13.	eP	Z	01 26 11
	H=07 59 22.6	USCGS			10.	iP	NEZ	05 17 53.3		P:N,E,C			13.	iP	NEZ	02 23 28.4
9.	iP	NEZ	12 12 47.3		iS	NE	18 10		Mag. 5 3/4 (Mat.)				P:S,E,D			
	i	N	54.6		P:N,E,D				8.8 N., 126.1 E. Mindanao, P.I.							
	S	N	13 37						h:79 km ca.							
	e	NE	49						H=04 50 33.9	USCGS						
	P:S,W,C															



Date	Phase	Comp.	Time(GMT)		
			h	m	s
13.	e	N	04	52	ca.
13.	iP Z, P NE S N		07	12	20.5 13 18
	P:N,E,D Mag. 5 3/4 - 6 (Mat.) 40.6 N., 142.0 E. Near east coast of Honshu, Japar. h:60 km ca. H=07 11 05.5 USCGS				
13.	PKP i PP e SS PSPS SSS e i eL eL eLr eLr	Z Z EZ E NE E E E E E E N E N	14	34	43 52.8 38 39 45 32 58 33 59 45 04 37 15 18 32 16 15 18 29 26.3 27.1
	Mag. 7 - 7 1/4 (Mat.) 39.7 S., 74.8 W. Near coast of southern Chile. h:61 km ca. H=14 14 57.7 USCGS				
13.	iP i P:S	N E	14	56	29.0 29.2
13.	iP i P:C	Z Z	14	48	49.2 49 02
13.	P	Z	15	02	37
13.	P i i e P:E,D	EZ Z E N	16	24	45.8 02.1 19 22
13.	iP iS P:C	Z NEZ	19	24	40.5 25 11.3
13.	iP iS i P:N,W,D	NEZ Z N	21	16	25.1 40.8 41.2
13.	iP e P:C	Z N	21	47	02.1 48 17

Date	Phase	Comp.	Time(GMT)		
			h	m	s
14.	iP i S P:D	Z E NE	02	13	16.3 16.7 28
14.	iP EZ, P M S L L eL P:N,E,D	Z NE N E N	04	03	57.9 06 38 07 14 08 19
	45.4 N., 151.1 E. Kurile Is. h:54 km ca. H=04 00 52.3 USCGS				
14.	iP eS L P:S,W,C	NEZ NE NE	10	12	59.6 14 11 36
14.	iP Z, P NE P:C		11	32	16.6
14.	e e	N N	13	36	32 ca. 40 43
14.	iP Z P N i iPcP iPcP P:N,C	 E Z E	14	48	54.2 54.8 37.5 38.3
	7.2 S., 146.2 E. Near north coast of New Guinea. h:200 km ca. H=14 41 04.2 USCGS				
14.	iP i i P:D	Z NE Z	21	31	26.5 27.2 37.6
	52.5 N., 167.2 W. Fox Is. h:22 km ca. H=21 23 40.4 USCGS				
14.	eP e	Z NE	22	46	31 23 05 35
	36.0 N., 69.3 E. Hindu Kush. h:69 km ca. H=22 37 11.9 USCGS				
14.	ePKP 1 i i i PKP 2 iPKP 2 ePP	Z Z E N N EZ Z	23	05	34 43.7 44.5 44.8 06 00 01.2 09 35
	(cont.)				

Date	Phase	Comp.	Time(GMT)		
			h	m	s
continued					
	23.5 S., 66.4 W. Jujuy Province, Argentina. h:245 km ca. H=22 46 07.6 USCGS				
15.	iP Z, P N e e i P:D	Z Z N NE	00	58	17.5 29 33 42
15.	P i i i S L L P:S	NZ E Z NE E N	05	40	58.7 59.2 42 58.6 45 29 47 09 19
	Mag. 5 1/2 - 5 3/4 (Mat.) 55.7 N., 163.9 E. Komandorskie Is. h:25 km ca. H=05 35 21.0 USCGS				
15.	iP i i i S P:S,C	NZ N N N	05	58	31.0 42 50 42
	45.3 N., 148.6 E. Kurile Is. h:35 km ca. H=05 55 48.2 USCGS				
15.	P i S e eSS eSS e Lq Lr E, eLr N	Z Z NE N E N NE	07	11	52 43 21 53 24 31 27 23 29 32 13 34 08 38 19
	Mag. 5 3/4 (Mat.) 13.4 S., 65.8 E. Indian Ocean. h:15 km ca. H=06 58 56.4 USCGS				
15.	P S S e e Lq eLq Lr E, eLr N	Z N E NE E N E	14	46	10 56 33 37 05 35 07 01 08 17 37 12 58
	Mag. 5 1/2 - 5 3/4 (Mat.) 13.5 S., 67.0 E. (cont.)				

Date	Phase	Comp.	Time(GMT)		
			h	m	s
continued					
	Indian Ocean. h:25 km ca. H=14 33 38.4 USCGS				
15.	iP eS i P:S,W,D	NEZ N EZ	17	17	57.2 18 33 40
15.	iP Z, P N i iS i P:C	 E NZ E	19	08	40.6 41.3 09 03.7 04.9
15.	P Z, eP N eS	N N	22	28	58 32 38
15.	iP S P:E,D	EZ NE	22	38	43.6 39 25
16.	iP i i i i i P:C	Z Z E Z N Z	03	06	49.2 51.2 51.5 07 16.5 17.7 18 28.0
	16.5 S., 71.5 W. Southern Peru. h:113 km ca. H=02 47 18.8 USCGS				
16.	eP e e e P	Z Z E E	08	21	42 6.2 S., 147.2 E. Near east coast of New Guinea. h:30 km ca. H=08 13 31.4 USCGS
16.	e e e	N N E	09	12	7 16.0 16.2
16.	eP e	Z N	10	42	46 11 10.7
	3.6 S., 68.7 E. Chagos Archipelago region. h:60 km ca. H=10 31 03.1 USCGS				
16.	P i i	EZ NEZ E	20	18	22.0 28.7 38.7
16.	iP i iS P:W,C	EZ N N	20	21	45.2 45.5 22 35



Date	Phase	Comp.	Time(GMT)		
			h	m	s
16.	iP Z, P NE		21	02	30.6
	i Z		03	35	
	i Z			55	
	P:C				
16.	iP Z		22	36	03.6
	i NE			09.0	
	eS NE		42	45	
	eL E		45	59	
	e E		47	25	
	L E, eL N		49	49	
	P:C				
					7.6 S., 128.8 E. Timor Is. region. h:63 km ca. H=22 27 52.7 USCGS
16.	P	NEZ	23	10	32
	e	N		18	47
	e	N		23	10
17.	P	Z	03	12	03.6
	i	N			04.1
	S	NE			20
	P:D				
17.	P	NEZ	05	02	15
	S	NEZ			36
17.	iP	NEZ	06	49	32.1
	S	EZ			54
	P:N,E,D				
17.	PKP	Z	09	53	28
					20.1 S., 11.4 W. Southern Atlantic Ocean. h:87 km ca. H=09 33 49.1 USCGS
17.	iP	Z	10	23	44.7
	i	N			44.9
	i	E			45.2
	e	E		25	01
	e	N			27
	e	E			29
	P:D				
17.	e	E	10	50.1	
	e	N		52.3	
	eL	E		58.3	
17.	ePKP	Z	11	43	54
	i	Z			55.5
	i N, e E			44	16
	e	E		47	52
	eSS	NE	12	03.7	
	eSSS	E		12.5	
	eSSS	N		12.6	
					(cont.)

Date	Phase	Comp.	Time(GMT)		
			h	m	s
continued					
	eL	NE	12	26.3	
	eL	NE		31.7	
	eL	E		38.6	
	eL	N		38.9	
					Mag. 5 3/4 - 6 (Mat.) 19.8 S., 12.2 W. South Atlantic Ocean. h:25 km ca. H=11 24 07.2 USCGS
17.	iP EZ, P N		17	44	02.5
	e	N			29
	e	E			31
	P:S,E,D				
17.	eS	N	18	21	50
	eL	E		24	18
	e	N		28	58
					1.7 S., 138.6 E. Near north coast of New Guinea. h:45 km ca. H=18 08 35.6 USCGS
17.	e	NE	20	29	11
18.	iP	NE	07	28	07.0
	S	NEZ			31
	P:S,W				
18.	iP	Z	20	49	34.1
	S	N		51	24
	i	EZ			27
	i	N			28
	eL	E		52	04
	P:C				
					44.5 N., 147.6 E. Kurile Is. h:32 km ca. H=20 47 02.5 USCGS
18.	eP ?	Z	21	41	55
	i	E			58
	e	Z		42	08
	e	E			12
	e	N		45	29
18.	P	Z	22	53	12
	eS	N	23	01	11
	eSS	N		04	44
	eL	N		06	53
	eL	N		09	22
	eL	E			33
					Mag. 5 1/4 - 5 1/2 (Mat.) 11.4 S., 166.2 E. Santa Cruz Is. h:62 km ca. H=22 43 46.4 USCGS

Date	Phase	Comp.	Time(GMT)		
			h	m	s
18.	P	EZ	22	55	59
	iS	E		56	14.2
19.	eP	Z	03	15	44
	i	Z		16	16
					25.9 N., 96.4 E. Northern Burma. h:27 km ca. H=03 08 29.3 USCGS
19.	iP	EZ	11	07	11.3
	iS	Z			15.5
	i	NEZ			16
	P:W,D				
19.	iP Z, P E		12	43	59.8
	S E, eS N			45	43
	e	EZ			45
	i	N			47
	i	E			48
	i	NZ			49
	P:N,W,C				
					27.0 N., 140.1 E. Bonin Is. region. h:283 km ca. H=12 41 31.4 USCGS
19.	iP EZ, P N		12	59	18.7
	i N, e E				45
	i	E			51
	P:S,E,D				
19.	iP	Z	17	08	00.1
	i	E			00.7
	e	NE			34
	P:C				
19.	iP	Z	17	08	49.7
	S	N		12	57
	e	E		13	00
	eL	N		14	48
	eL	E			55
	P:D				
					54.1 N., 160.6 E. Near east coast of Kamchatka. h:25 km ca. H=17 03 39.0 USCGS
19.	P	EZ	20	22	12.7
	eS	NE			59
	P:W,D				
19.	iP	Z	21	58	15.9
	i	E			16.1
	e	NE			35
	i	E			39.1
	i	NZ			39.7
	P:D				

Date	Phase	Comp.	Time(GMT)		
			h	m	s
20.	P	EZ	00	33	22
	e	N			34 04
20.	iP	EZ	02	13	20.7
	i	N			21.2
	S	EZ			35
	P:E,D				
20.	ePKP	Z	20	29	12
	e	E			55.2
	e	E			59.6
	eL	N	21	14.9	
	eL	E			24.1
	eL	E			31.5
					Mag. 6 1/2 (Mat.) 35.6 S., 15.4 W. Tristan da Cunha region. h:37 km ca. H=20 03 39.0 USCGS
20.	iP	NZ	22	30	01.2
	i	E			01.7
	eL	E			38 42
	e	N			38.8
	eL	N			41.2
	P:S,D				
					Mag. 5 3/4 (Mat.) 0.5 N., 122.0 E. Northern Celebes. h:59 km ca. H=22 22 44.6 USCGS
21.	iP	Z	00	25	45.2
	i	Z		26	09.2
	S	E			31 50
	L	E			35 48
	P:D				
					4.3 S., 145.3 E. New Guinea. h:39 km ca. H=00 18 01.5 USCGS
21.	P	EZ	01	07	13
	eL	E			17 48
	P:D				
					5.5 S., 149.5 E. New Britain. h:177 km ca. H=00 59 25.2 USCGS
21.	P	Z	03	36	59.5
					26.4 N., 88.6 E. Nepal - India border. h:81 km ca. H=03 29 11.8 USCGS
21.	iP	EZ	04	28	30.4
	i	E			29 11
	P:W,C				











Date	Phase	Comp.	Time(GMT)		
			h	m	s
31.	P i i i S	Z	16	55	47.5
		EZ			48.5
		Z		56	12
		E			16
		NE			19

31.	P ePP eS L L	Z	17	27	42.5
		E		28	35
		N		32	32
		E		35	33
		N			47

Mag.  $5\frac{1}{4}$  -  $5\frac{1}{2}$  (Mat.)

13.7 N., 120.1 E.

Near coast of Mindanao, P.I.

h: 22 km ca.

H=17 21 55.1 USCGS

31.	P	Z	22	23	39.0
		39.1 N., 36.3 E.			Turkey.
		h: 44 km ca.			
		H=22 11 53.9			USCGS

31.	P i P:W	EZ	22	41	48.0
		E		42	13.7

31.	iP i S i P:E	EZ	22	51	24.0
		E			48
		E			56
		N			57

Takeshi Honda

Director.