





Date	Phase	Comp.	Time(GMT)			Date	Phase	Comp.	Time(GMT)		
			h	m	s				h	m	s
2.	P S i i P:S,W,C	NEZ NEZ Z N	11	53	03.3	3.	P S L P:D Mag. 5 1/2 - 5 3/4 (Mat.) 22.9 S., 171.4 E. Loyalty Is. region. h:27 km ca. H=06 25 37.9	Z E E	06	36	33.0
2.	P i i eS? P:E,D	EZ E N	13	49	24.5 28.2 37 50 20	3.	P i P:C 5.7 S., 147.4 E. Near coast of New Guinea. h:25 km ca. H=09 46 16.7	Z Z	09	54	20.5 42.6
2.	ePS PSPS L L Mag. 5 3/4 (Mat.) 4.7 S., 106.3 W. Pacific Ocean, west of Galapagos Is. h:25 km ca. H=15 18 54.3	E E E NZ	15	47	48 35 50 32	4.	eL L Mag. 5 3/4 - 6 (Mat.) 44.1 S., 74.8 W. Near coast of southern Chile. h:95 km ca. H=22 51 15.6	N E	00	01	14 45
2.	P S P:S,W	NEZ NEZ	20	48	05.4 05.9	4.	P i iS P:D	Z NE NE	02	32	41.7 42.0 33 02.5
2.	P i i i P:D	Z E E Z	21	06	41.6 42.3 52 07 30	4.	e eL	E E	03	36.0 46.8	
2.	P S i i	Z N N N	21	19	48 57.4 58.3 20 04.4	4.	eL	NE	07	08	15 ca.
2.	P S	Z N	22	21	16.4 17.5	4.	eL	E	08	56	27
2.	P S i P:D	Z N E	23	54	05.7 25.5 27	4.	PKP 1 i PKP 2 20.4 S., 67.6 W. Near Chile - Bolivia border. h:109 km ca H=10 19 33.7	Z Z Z	10	39	21 28 52
3.	P S P:E,C	EZ NE	01	25	19.3 38	4.	P i S P:C	Z E N	12	03	34.6 35.2 04 06
3.	iP i S L P:S,C 42.3 N., 143.9 E. Hokkaido, Japan. h:60 km ca. H=05 15 55.8	NZ E E NE	05	17	33.4 34.0 18 53 19 10	4.	P i i S	Z N E N	13	05	05.7 07.2 29 41
						4.	e e	E E	18	54	10 50



Date	Phase	Comp.	Time(GMT)			Date	Phase	Comp.	Time(GMT)		
			h	m	s				h	m	s
4.	eP 51.8 N., 167.3 W. Fox Is., Aleutian Is. h:99 km ca. H=18 59 58.2	Z	19	07	17	5.	P i P:S,W	NE Z	19	12	09.4 55
4.	iP iS P:N,E	NEZ NE	19	36	43.0 48.3	5.	P P:S,E,D 20.8 S., 176.1 W. Tonga Is. region. h:58 km ca H=21 25 55.6	NEZ	21	37	12.8
4.	eP e i e	Z Z Z N	21	22	44 49 54 58	5.	P i i eS P:C	Z N N N	21	44	29.8 37 44 45 02
4.	iP i i S i i P:N,E,D 37.8 N., 141.6 E. Near coast of Honshu, Japan. h:61 km ca. H=22 26 01.2	Z EZ N N E N	22	26	56.6 58.5 59.0 27 29 38 52	5.	iP i S S P:S,E,D	NEZ N N N	22	13	15.2 30.3 38
5.	P i i S L L L i P:N,C Mag. 6 - 6 1/4 (Mat.) 10.7 S., 161.6 E. Solomon Is. region. h:99 km ca. H=01 26 26.1	NZ E NZ N E E Z N	01	35	26.5 27.8 36 42 46 46 40 48 42 50 32 02 01 32	6.	P S P:S,E,C	NEZ NE	05	10	48.0 11 03.4
5.	P i i S L L L i P:N,C Mag. 6 - 6 1/4 (Mat.) 10.7 S., 161.6 E. Solomon Is. region. h:99 km ca. H=01 26 26.1	NZ E NZ N E E Z N	01	35	26.5 27.8 36 42 46 46 40 48 42 50 32 02 01 32	6.	P i i P:C	Z N	05	42	41.1 41.6
5.	P i i S L L L i P:N,C Mag. 6 - 6 1/4 (Mat.) 10.7 S., 161.6 E. Solomon Is. region. h:99 km ca. H=01 26 26.1	NZ E NZ N E E Z N	01	35	26.5 27.8 36 42 46 46 40 48 42 50 32 02 01 32	6.	P i i P:C	Z N	05	42	41.1 41.6
5.	iP iS P:S,E,D	NEZ NEZ	04	47	48.0 04.0	6.	P S i P:W,C	EZ E N	16	04	56.8 05 36 46
5.	P i i S P:W,C	EZ N E N	14	28	32.3 32.8 50 29 12	6.	e eL eL	E N N	22	41	16 47 14 50 24
5.	iP S P:N,W,D	NEZ NE	14	37	24.2 24.9	7.	P i S i P:N,W,C 28.8 N., 139.1 E. West of Bonin Is. h:25 km ca. H=02 47 25.8	NEZ E E N	02	50	00.4 03 51 25 28
5.	P S P:W,C	EZ E	16	35	21.1 40.0	7.	iP i S P:W,D	EZ N E	03	18	48.4 48.7 19 04



Date	Phase	Comp.	Time(GMT)			Date	Phase	Comp.	Time(GMT)			
			h	m	s				h	m	s	
7.	P	Z	03	46	23	7.	e	E	17	47	37	
	i	E			41		e	N			42	
	e	N			48 02		L	NE	18	00	48	
	S?	E			04.7							
7.	P	NEZ	04	18	51.9	7.	eP	Z	19	06	02	
	i	Z			52.3		eL	E			09 51	
	S	N			20 38	7.	eP	Z	19	21	55	
	i	E			40		SKS	E			32 22	
	i	NE			21 15		SS	N			39 18	
	eL	E			26		i	E			48 00	
	P:S,E,D						Lq	N				
	28.0 N., 142.8 E.						Mag. 6 (Mat.)					
	Bonin Is. region.						38.2 S., 78.1 E.					
	h:123 km ca.						Indian Ocean.					
	H=04 16 44.1 USCGS						h:30 km ca.					
							H=19 08 36.1 USCGS					
7.	P	NZ	05	46	44.4	7.	P	NZ	19	25	31	
	i	E			46							
	S	Z			48 27	7.	iP	EZ,P N	23	19	55.8	
	L	E			49 16		PcP	NZ			21 45	
	P:D						i	E			46.6	
7.	PKP	Z	07	02	51.1		iScP	Z			25 34	
	i	N			55		eScS	E			29 47	
	i	Z			03 14		L	E			31 20	
	L	E			51 44		Lr	Z			32 53	
	L	Z			52 17		P:N,W,C					
	PKP:C						Mag. 5 1/2 (Mat.)					
	Mag. 6 1/4 (Mat.)						4.7 S., 153.2 E.					
	43.3 S., 80.4 W.						New Britain region.					
	Off coast of Chile.						h:90 km ca.					
	h:60 km ca.						H=23 11 59.6 USCGS					
	H=06 43 10.6 USCGS											
7.	iP	NZ,P E	08	28	58.3	8.	iP	Z	00	25	50.4	
	S	E			29 12		PP	Z			27 43.3	
	i	NE			15		P:D					
	P:S,W,C						52.2 N., 165.2 W.					
							Fox Is., Aleutian Is.					
							h:63 km ca.					
							H=00 17 58.4 USCGS					
7.	iP	1 NZ	10	22	34.9	8.	iP	Z	03	34	35.4	
	P	2 NEZ			35.9		i	E			37	
	i	N			38.0		P:C					
	i	N			24 17		4.0 S., 141.8 E.					
	iPP	E			25 17		New Guinea.					
	i	Z			30		h:217 km ca.					
	iS	NE			32 32.4		H=03 27 16.2 USCGS					
	ScS	E			33 06.4	8.	P	Z	04	44	03.6	
	iLq	E			43 23		i	E			03.9	
	Lq	N			43 30		i	E			11.4	
	Lr	Z			47 20		S	N			44.4	
	Lr	NE			28		P:C					
	PKPPKP	Z			49 36	8.	eL	N	06	47	2	
	eSKPPKP?	Z			52 36	8.	e	NE	08	07	44	
	PKPPKPPKP	Z	11	09	34							
	P 1:S,D											
	Mag. 7 1/2 (Mat.)											
	28.2 S., 175.7 W.											
	Kermadec Is. region.											
	h:43 km ca.											
	H=10 10 38.9 USCGS											

Date	Phase	Comp.	Time(GMT)			Date	Phase	Comp.	Time(GMT)		
			h	m	s				h	m	s
8.	P	Z	08	38	35	9.	iP	Z	15	32	01.4
	17.7 S., 178.7 W.						P:D				
	Fiji Is. region.										
	h:620 km ca.										
	H=08 28 34.6 USCGS					9.	L	E	22	39	25
8.	eP	Z	13	12	21		L	E			40 30
	40.0 S., 74.3 W.						L	Z			41 13
	Near coast of Chile.					10.	eP	Z	03	13	49
	h:96 km ca.						e	N			40.2
	H=12 52 28.8 USCGS						eL	N			44.2
							eL	N			59.7
8.	P	EZ	15	37	07.1		51.9 N., 161.6 E.				
	S	N			38		Macquarie I. region.				
	i	E			41		h:25 km ca.				
	P:W,C						H=03 00 43.3 USCGS				
8.	iP	Z	19	52	01.9	10.	PKP	Z	15	51	48
	i	E			04.4		eSKKS	NE	16	02	25
	i	Z			52.3		eSSS	NE	19	38	
	P:D						23.5 S., 65.4 W.				
	2.2 N., 128.3 E.						Jujuy Province, Argentina.				
	Halmahera.						h:118 km ca.				
	h:370 km ca.						H=15 31 37.2 USCGS				
	H=19 45 43.0 USCGS					10.	iP	NEZ	18	23	56.3
8.	iP	NZ	23	03	08.9		i	E			24 20
	i	E			09.1		S	NE			42
	S	E			04 03		P:N,W,D				
	i	N			06 02	10.	iP	NEZ	23	45	01.3
	P:S,D						i	N			22
	Mag. 5 (Mat.)						P:N,W,C				
	32.5 N., 141.7 E.						10.1 S., 161.4 E.				
	Off coast of Honshu, Japan.						Solomon Is. region.				
	h:37 km ca.						h:139 km ca.				
	H=23 01 55.9 USCGS						H=23 36 08.8 USCGS				
9.	e	E	05	09	1	11.	P	Z	01	04	03.6
	eL	E			15.6		i	Z			05.3
9.	iP	NZ	08	17	03.1	11.	P	Z	01	34	36
	i	EZ			12		52.9 N., 167.3 W.				
	i	E			22		Fox Is., Aleutian Is.				
	i	Z			30		h:98 km ca.				
	S	E			18 05		H=01 27 02.3 USCGS				
	i	E			18						
	P:S,D					11.	P	Z	01	35	36
9.	iP	NEZ	09	13	25.5		S	E			38 53
	i	E			50		eLq	E			39 21
	S	E			14 00		Lr	E			41 08
	P:N,E,D						Mag. 6 1/4 - 6 1/2 (Mat.)				
							43.7 N., 154.6 E.				
							Kurile Is.				
							h:26 km ca.				
							H=01 31 34.4 USCGS				
9.	P	Z	12	59	51.7	11.	eP	Z	02	36	35
	P:C						16.3 S., 173.0 W.				
	66.0 N., 156.6 W.						Tonga Is. region.				
	Central Alaska.										
	h:85 km ca.										
	H=12 51 02.1 USCGS										

(cont.)



Date	Phase	Comp.	Time(GMT)		
continued			h	m	s
			h:25 km ca. H=02 25 17.0 USCGS		
11.	P S	Z NE	03	21	06.1 24
11.	iP iS	NEZ NE	03	46	24.6 35.6
P:N,E					
11.	eP	Z	07	26	28
52.8 N.,168.6 W. Fox Is., Aleutian Is. h:40 km ca. H=07 18 44.9 USCGS					
11.	P? e e eS eSS eSSS eL eL eL L	Z Z E N E E N E N NE	08 09	54 04	03 07 10 14 17 23 26 29
Mag. 6 - 6 1/4 (Mat.) 11.2 N.,43.3 E. Near coast of British Somaliland. h:18 km ca. H=08 41 00.0 USCGS					
11.	e	EZ	13	52	26
11.	e	E	19	52.0	
12.	i i	Z N	01	44	26 29
12.	iP i iS i i	E,P EZ EZ Z EZ	01	55	20.2 22 56 03 09 15
P:W					
12.	eP eL	Z E	03	03	17 35.0
Mag. 5 1/4 - 5 1/2 (Mat.) 17.4 N.,107.3 W. Off coast of Mexico. h:57 km ca. H=02 49 33.4 USCGS					
12.	eP i i	EZ NZ EZ	03	07	15 23 27

Date	Phase	Comp.	Time(GMT)		
			h	m	s
12.	P i	Z Z	14	34	41 35 20
12.	iP e i	EZ N E	16	42	50.9 43 12 14
P:W,C					
12.	iP i i i iS	Z,P N Z N E NEZ	23	23	39.5 46 46.6 47.7 55.1
P:D					
12.	iP i S SS Lq Lq eLr eLr	NZ E N N N E N Z	23	33	33.7 34.2 43 30 48 29 54 00 18 58 13 15
P:S,D Mag. 5 3/4 - 6 (Mat.) 28.4 S.,176.0 W. H=23 21 42.5 Tonga Is. region. h:113 km ca. USCGS					
12.	iP S	EZ,P NE	23	54	38.2 55 03
P:N,W,C					
13.	iP i iS i	Z N NZ,S E	03	38	53.7 53.9 39 13.7
P:C					
13.	eP e	Z E	04	44	37 54.0
5.2 S.,135.4 E. Aroe Is. region. h:229 km ca. H=04 37 13.4 USCGS					
13.	P e e	Z Z E	04	59	16 05 01 06 10 22
5.2 S.,153.3 E. New Britain. h:25 km ca. H=04 51 13.9 USCGS					
13.	eP SKS e PS SS eLq	Z NE N E NE E	08	17	13 27 49 28 36 29 58 35 16 43 08

Date	Phase	Comp.	Time(GMT)		
continued			h	m	s
			h:49 km ca. H=08 03 43.9 USCGS		
13.	P	Z	10	14	52
5.5 S.,146.7 E. New Britain region. h:75 km ca. H=10 06 56.0 USCGS					
13.	eP	Z	16	31	02
13.	e	N	17	37.1	
13.	e	N	18	44.4	
13.	P e eL eL	Z NE E N	19	29	50 46 12 59.0 20 10 08
34.4 N.,26.5 E. Crete. h:25 km ca. H=19 17 16.1 USCGS					
13.	iP i iS i	NZ E NE Z	19	51	15.9 16.2 40.8 41.2
P:N,C					
13.	ePKP	Z	20	55	19
56.2 S.,27.2 W. Sandwich Is. h:56 km ca. H=20 35 15.4 USCGS					
13.	e	NE	21	44.0	
16.9 S.,178.1 W. Fiji Is. region. h:600 km ca. H=21 16 13.1 USCGS					
13.	P S	NEZ E	22	10	54 11 37
13.	P i e i e e	Z Z E N N Z	23	03	24.2 28.7 41 50.2 04 00 09
14.	iP P:W,C	EZ	00	03	04.7

Date	Phase	Comp.	Time(GMT)		
			h	m	s
14.	iP i i i e	NZ Z N E N	01	06	50.2 53 55 57 58
P:S,C 42.9 N.,140.2 E. Off west coast of Hokkaido, Japan. h:147 km ca. H=01 05 06.2 USCGS					
14.	e i i i	EZ Z E Z	04	02	52 56 03 05 08
14.	eP	Z	04	29	25
18.8 S.,172.6 W. Tonga Is. region. h:25 km ca. H=04 18 06.5 USCGS					
14.	iP i i S	EZ EZ N NZ	05	47	05.7 08.7 12 44
14.	eP e e	Z Z Z	09	28	51 29 02 29
14.	eP eL	Z NE	12	06	52 18 22
67.8 N.,164.9 W. Bering Strait. h:78 km ca. H=11 58 53.9 USCGS					
14.	e	NE	13	59	20
14.	P	Z	14	00	23.5
P:C 22.0 S.,172.1 E. New Hebrides Is. region. h:25 km ca. H=13 49 31.7 USCGS					
14.	e	E	16	31.7	
14.	e	E	16	55.0	
15.	iP P:C	Z	03	24	31.9
15.	P eS? e	Z N E	06	03	56 04 22 27



Date	Phase	Comp.	Time(GMT)		
			h	m	s
15.	P S i i P:N,W,D	NEZ N Z E	06	43	01
					25.3
					26.5
					26.9
15.	P i i eS eL	Z E N NE NE	07	57	01.6
					09
					10
			08	01	08
					02 45
15.	iP P:C	Z	10	22	36.0
15.	iP i i PP e S Lq Lr eLr P:C	Z NE Z Z N NE E N Z	10	22	39.8
					40.0
					45.8
			24	13	
					22
			28	52	
			31	40	
			34	16	
					18
					Mag. $6\frac{1}{4}$ - $6\frac{1}{2}$ (Mat.)
					3.3 S., 150.7 E.
					New Ireland region.
					h:21 km ca.
					H=10 14 55.5
					USCGS
15.	P i	Z E	11	23	25.3
					24 12
15.	P e eS? i	Z N E Z	12	13	53
					14 13
					23
					33
15.	P E, eP i pP PcP i ScP e e eL eL P:E	Z Z N Z E N E E N	13	08	55
					57
			09	24	
			10	45.3	
					46
			14	32	
					18 17
					24
					20.0
					21.8
					Mag. $5\frac{1}{4}$ - $5\frac{1}{2}$ (Mat.)
					4.4 S., 152.5 E.
					New Britain.
					h:99 km ca.
					H=13 01 02.2
					USCGS
15.	eP	Z	13	54	43

Date	Phase	Comp.	Time(GMT)		
			h	m	s
15.	P i S eL P:C	Z NEZ N NE	16	19	29.0
					29.2
			21	14	
					36
					27.5 N., 142.9 E.
					Bonin Is.
					h:100 km ca.
					H=16 17 16.8
					USCGS
15.	iP i eS i P:W,C	EZ Z N N	19	16	11.0
					20.8
					53
			17	43.7	
15.	iP eS? i i i i P:N,E,C	NEZ N N E N Z	22	18	28.6
					20 13
					26
					31
					38
					44
15.	eP? i i	Z Z N	23	09	29
					33.6
					38
16.	iP e P:C	Z Z	04	07	38.0
					51
					13.4 S., 165.9 E.
					New Hebrides Is.
					h:53 km ca.
					H=03 58 00.9
					USCGS
16.	iP Z,P pP P:D	NE Z	04	41	18.2
					43 03.5
					24.9 S., 179.9 E.
					Kermadec Is. region.
					h:536 km ca.
					H=04 30 39.9
					USCGS
16.	iP Z,P i eS eL L P:C	NE Z E N E	05	04	15.0
					22
					09 18
					11 06
					40
					51.7 N., 176.1 E.
					Rat Is., Aleutian Is.
					h:39 km ca.
					H=04 58 00.4
					USCGS
16.	P S	NZ NE	05	17	28
					53

Date	Phase	Comp.	Time(GMT)		
			h	m	s
16.	P 6.6 S., 106.5 E. Soenda Strait. h:135 km ca. H=07 15 41.7	Z	07	24	41
					USCGS
16.	iP i P:D	Z Z	08	04	06.0
					17
					19.0 S., 172.7 W.
					Tonga Is.
					h:25 km ca.
					H=07 52 39.6
					USCGS
16.	eP e e	Z NZ N	09	23	35
					44
					26 18
16.	iP i sP eS L e P:N,C	NZ E NZ NEZ E E	11	27	41.0
					41.4
					28 09.1
					34 00
					37 17
					38 16
					6.4 S., 103.7 E.
					Banda Sea.
					h:77 km ca.
					H=11 19 43.5
					USCGS
16.	iP Z,P i i P:N,W,D	NE E N	11	36	59.3
					37 45
					47
16.	P	Z	12	50	48
16.	iP PP S i i ScS iSS Lq Lq eLr eL eW 2q eW 2r P:N,E,C	NEZ Z E N E E E E N Z N NE Z	13	54	04.4
					56 05
					14 00 53
					59
					01 13
					03 57
					04 14
					35
					37
					07.5
					15 21.0
					54 ca.
					16 15 33
					Mag. $6\frac{1}{4}$ - $6\frac{1}{2}$ (Mat.)
					8.2 S., 122.0 E.
					Flores I.
					h:74 km ca.
					H=13 45 35.6
					USCGS
16.	P	Z	14	26	51

Date	Phase	Comp.	Time(GMT)		
			h	m	s
16.	P P:C	Z	15	31	15.8
					49.6 N., 154.3 E.
					Kurile Is.
					h:42 km ca.
					H=15 26 56.2
					USCGS
16.	iP i S i P:S,E,D	NEZ NEZ NEZ NE	16	58	38.6
					41
					58
					59 06
16.	iP iS L L P:C	Z E E N	18	29	43.4
					36 33.9
					40 13
					17
					8.1 S., 122.0 E.
					Flores I.
					h:43 km ca.
					H=18 21 12.2
					USCGS
16.	iP Z,P i i i P:D	NE NZ Z E	19	10	25.7
					45
					11 12
					23
16.	P eL P:D	Z N	20	16	54.9
					43 36
					23.6 S., 176.0 W.
					Tonga Is. region.
					h:101 km ca.
					H=20 05 27.2
					USCGS
16.	P PP S i i ScS iSS Lq Lq eLr eL eW 2q eW 2r P:N,E,C	Z Z E N E E E E N Z N NE Z	22	44	53
					53
					23.8 S., 175.6 W.
					Tonga Is. region.
					h:25 km ca.
					H=22 33 13.1
					USCGS
16.	iP P:D	Z	23	31	08.8
					23.6 S., 175.5 W.
					Tonga Is. region.
					h:20 km ca.
					H=23 12 43.5
					USCGS
17.	eP? e i	Z Z Z	03	58	44
					52
					59 14
17.	P eS L	NEZ NE NE	04	59	36
					05 06 26
					10 10
					8.3 S., 122.1 E.
					Flores I.
					h:93 km ca.
					H=04 51 10.4
					USCGS





Date	Phase	Comp.	Time(GMT)		
			h	m	s
17.	P S	NEZ N	04	59	49 52
17.	P P:C	Z	06	18	14.3
8.4 S., 121.3 E. Near Flores I. h:600 km ca. H=06 09 46.7 USCGRS					
17.	P S i	Z Z N	07	52	54 54 08.3 09
17.	P	Z	08	59	44
17.	P i i i	NEZ EZ N N	11	49	30 30.7 30.9 36.3
17.	P i S SS i eLq eLq eLr	EZ Z N N E E N EZ	14	18	21 30 28 00 32 26 41 37 30 34 41.1
Mag. 5 3/4 - 6 (Mat.) 23.8 S., 175.9 W. Tonga Is. region. h:120 km ca. H=14 06 51.6 USCGRS					
17.	P eL	NZ N	16	28	35 55 00
17.	P i S	Z N N	17	54	28.3 29.8 51
17.	P eS P:C	Z N	19	02	24.3 03 13
17.	P e i e e	NEZ N Z NE Z	19	26	39 54 27 15 35 52
17.	P i sP eS ScS i SS e	Z N Z E N E N E	20	22	09.1 22.2 47 31 22 32 34 38 36 11 30
(cont.)					

Date	Phase	Comp.	Time(GMT)		
			h	m	s
continued					
17.	eLq eLr L	E NE E	20	40	6 45.0 47 31
Mag. 6 - 6 1/4 (Mat.) 24.3 S., 175.6 W. Tonga Is. region. h:79 km ca. H=20 10 36.4 USCGRS					
17.	P e e	Z E Z	22	31	53 32 30 31
17.	iP S E, eS N P:S, E, D	NEZ	22	41	07.7 48
Mag. 5.4 (Mat.) 34.1 N., 141.0 E. Off south coast of Honshu, Japan. h:120 km ca. H=22 40 21.5 USCGRS					
18.	iP Z, P e P:C	NE E	01	57	17.7 02 02.1
18.	P	Z	02	03	18
18.	iP Z, P i i eS L P:C	N N E E E	02	17	11 18.0 18 10.3 23 59 27 45
8.2 S., 122.0 E. Flores I. h:35 km ca. H=02 08 38.5 USCGRS					
18.	P i eS	EZ N N	02	34	47 35 13 29
18.	iP Z, P S P:C	NE NE	02	55	49.8 56 09
18.	iP i S i PS SS Lq iLq eLr eW 2 eW 2 e	Z N N E N N N E Z Z Z	06	24	35.8 36.5 26 40 52
Mag. 7 - 7 1/4 (Mat.) 49.9 S., 163.3 E. South of New Zealand. h:38 km ca. H=14 54 59.3 USCGRS					
18.	P e e e e	Z Z Z Z N	08	38	26 40 38
24.3 S., 174.2 W. Tonga Is. region. h:25 km ca. H=08 26 49.0 USCGRS					

Date	Phase	Comp.	Time(GMT)		
			h	m	s
18.	P eS	Z NZ	08	59	49 09 02 03
18.	eP e	Z Z	09	39	38 40 33
20.6 S., 175.5 W. Tonga Is. region. h:667 km ca. H=09 29 23.5 USCGRS					
18.	iP P:C	Z	09	51	55.8
28.9 S., 178.4 W. Kermadec Is. region. h:385 km ca. H=09 40 40.7 USCGRS					
18.	iP S P:D	Z NE	10	18	31.8 19 56
29.5 N., 138.6 E. Bonin Is. region. h:500 km ca. H=10 16 48.5 USCGRS					
18.	iP S P:E	EZ N	13	55	58.7 56 34
18.	P i S i i PS SS Lq iLq eLr eW 2 eW 2 e	Z E N E E N N N E E Z Z Z	15	07	56 08 16 18 20 44 20 14 24 34 32 45 48 37 02 17 06 ca. 07 ca. 13 ca.
Mag. 7 - 7 1/4 (Mat.) 49.9 S., 163.3 E. South of New Zealand. h:38 km ca. H=14 54 59.3 USCGRS					
18.	iP Z, P P:N, C	N C	17	45	47.4
7.6 N., 126.9 E. Off east coast of Mindanao, P. I. h:63 km ca. H=17 39 34.3 USCGRS					
18.	eP? e e e	E N Z N	20	10	53 56 11 10 15
(cont.)					

Date	Phase	Comp.	Time(GMT)		
			h	m	s
continued					
25.4 N., 122.6 E. Off north coast of Formosa. h:25 km ca. H=20 06 57.3 USCGRS					
18.	e e eL	E N NE	23	32	50 33 00 43 53
19.	iP S i P:S, W, C	NEZ E Z	04	53	13.6 54 21 27
40.5 N., 142.9 E. North of Honshu, Japan. h:14 km ca. H=04 51 52.2 USCGRS					
19.	P i eL	Z Z E	05	08	25 09 35 19 56
6.4 S., 105.5 E. Soenda Strait. h:120 km ca. H=04 59 19.3 USCGRS					
19.	eP i e i	Z N Z N	05	09	45 ca. 51.8 10 14 31
19.	P eS e eSS Lq Lq eLr	NZ E N N E N Z	07	25	02 33 13 18 37 09 40 00 03 42.6
Mag. 6 (Mat.) 16.0 S., 168.2 E. New Hebrides Is. h:90 km ca. H=07 14 57.4 USCGRS					
19.	iP i i eL	NEZ Z Z E	07	58	27.5 08 01 13 40 06 44
P:N, E, C 2.3 N., 127.4 E. Molucca Passage. h:83 km ca. H=07 51 35.0 USCGRS					
19.	P i S e P:E	EZ E N Z	08	42	25 55 43 18 20





Date	Phase	Comp.	Time(GMT)		
			h	m	s
19.	iP NE,P Z	Z	09	19	25.5
	i	Z			26.0
	i	NE			26.2
	S	NZ			56
	P:S,E,D Mag. 5.2 (Mat.) 37.2 N.,140.7 E. Honshu, Japan. h:115 km ca. H=09 18 53.4				
19.	iP Z,P E	NEZ	11	47	34.6
	S			48	15
	P:C				
19.	P	Z	12	15	54
	S	N		24	16
	e	E			27
	eSS	N		28	02
	eLq	NE		31	00
	eLr	Z		34	20
	Mag. 5 3/4 (Mat.) 16.4 S.,167.3 E. New Hebrides Is. h:16 km ca. H=12 05 47.7				
19.	P	NZ	12	55	51
	P:C 8.1 S.,121.9 E. Flores I. h:25 km ca. H=12 47 12.5				
19.	iP	Z	13	19	53.2
	S	NE		20	31
	P:C				
19.	P	Z	17	30	44
19.	eP	Z	19	11	14
	S	N		15	41
	eL	NE		17	33
19.	eP?	Z	19	54	19
	i	Z			21.4
	i	Z			27.0
19.	e	N	21	10	32
	24.1 S.,176.1 W. Tonga Is. region. h:39 km ca. H=20 33 55.7				
20.	iP E,P NZ	N	02	21	19.3
	S				40.1
	P:S,E,D				
20.	P	EZ	03	37	20.2
	eS	NE			39
	P:W,C				

Date	Phase	Comp.	Time(GMT)		
			h	m	s
20.	iP Z,P E	Z	03	39	34.9
	i				44.9
	pP	E			53
	e	E		40	31
	P:C 36.6 N.,71.1 E. Hindu Kush. h:121 km ca. H=03 30 27.4				
20.	iP Z,P NE	NEZ	03	54	41.3
	iS			55	01.7
	P:N,E,D				
20.	eL	N	07	05	00 ca.
	eL	N		06	43
	eL	NE		15	50
	eL	N		21	10
	Mag. 6 - 6 1/4 (Mat.) 11.5 N.,86.3 W. Off west coast of Nicaragua. h:122 km ca. H=06 16 23.9				
20.	eP?	Z	07	37	20
	i	Z			23
20.	e	NE	11	37	16
	16.4 N.,121.5 E. Luzon, P. I. h:30 km ca. H=11 27 05.4				
20.	iP	NEZ	11	41	02.8
	i	NEZ			03.5
	i	E		42	36
	S	N			54
	i	E			56
	P:N,E,D 46.3 N.,142.7 E. Sakhalin I. h:354 km ca. H=11 38 39.3				
20.	eP	Z	13	51	17
	eS	NE		52	12
20.	eP?	Z	14	08	14
	i	Z			29
	e	N			34
20.	iP	NZ	16	04	09.4
	i	NEZ			10
	epP	Z		05	12
	e	N		09	11
	pPPP	N			40
	iS	NE		13	05
	iScS	E		14	01
	L	E		22	06
	L	N			10

Date	Phase	Comp.	Time(GMT)		
			h	m	s
continued			16	26	26
	e	Z			
	PKP 1	PKP 1		32	09
		Z			
	ePKP 2	PKP 2			55
		Z			
	P:S,D Mag. 6 3/4 (Mat.) 18.4 S.,175.2 W. Tonga Is. h:175 km ca. H=15 53 09.9				
20.	eP	Z	23	54	13
	i	Z			15
	ePP	Z		57	16
	eS	E	00	03	36
	i	N			56
	ScS	E		04	24
	SS	N		08	24
	eLq	E		13	06
	eLq	N			32
	eLr	NZ		16	38
	eLr	E			59
	L	N		19	06
	L	E			46
	Mag. 6 1/2 (Mat.) 24.2 S.,175.9 W. Tonga Is. region. h:25 km ca. H=23 42 33.9				
21.	P	Z	01	25	34
	i	E			36.3
	eLr	Z	02	11	28
	eLr	Z		34	24 ca.
21.	ePKP 1	Z	04	53	43
	21.7 S.,67.4 W. Southern Bolivia. h:25 km ca. H=04 33 47.5				
21.	P	Z	09	32	53
	e	E		10	16
	e	N			36
	21.8 S.,179.9 W. South of Fiji Is. h:595 km ca. H=09 22 31.7				
21.	iP	NZ	14	19	20.2
	i	E			20.5
	i	E		20	17
	S	N			19
	P:S,D				
21.	P	Z	20	05	39.9
	eS	E		14	34
	eScS	N		15	44
	eL	NE		23	03

Date	Phase	Comp.	Time(GMT)		
			h	m	s
			22.8	S.,171.4	E.
	Loyalty Is. region. h:19 km ca. H=19 54 44.4				
	USCGS				
22.	P	Z	04	22	48.3
	i	E			50.9
	eS	Z		29	53
	e	N		30	49
	L	E		35	23
	Lr	Z		39	22
	9.0 S.,157.9 E. Solomon Is. h:41 km ca. H=04 14 03.4				
	USCGS				
22.	P	Z	08	34	21
	i	NEZ			32
	i	N		35	18
	iS	Z			23
22.	iP	NEZ	11	30	59.1
	i	E		31	21.9
	iS	N			22.4
	i	Z			23.5
	P:N,E,D				
22.	iP	Z	14	02	37.9
	i	E		03	36.3
	i	N			36.8
	P:C				
22.	iP	Z	14	07	03.5
	P:D 18.0 S.,178.3 W. Fiji Is. h:610 km ca. H=13 56 59.5				
	USCGS				
22.	iP Z,P N	N	17	53	06.6
	e			56	23
	P:N,D				
22.	iP	NEZ	18	50	27.0
	i	E		51	13
	P:N,W,D				
22.	iP	Z	21	39	17.4
	i	NE			17.9
	eS	N		48	02
	e	E			44
	P:D 24.6 S.,179.3 E. South of Fiji Is. h:517 km ca. H=21 28 41.6				
	USCGS				
23.	iP	Z	01	55	10.2
	i	N			10.5
	eS	E		02	01















Date	Phase	Comp.	Time(GMT)			Date	Phase	Comp.	Time(GMT)		
			h	m	s				h	m	s
5.	iP i P:N,E,D	NZ N	14	10	15.8 49	6.	P e eL eL	NZ E N E	22	35	42 44 00 54 00 55 25
5.	iP P:S,W,C	NEZ	20	55	52.4	Mag. $5\frac{1}{2}$ - $5\frac{3}{4}$ (Mat.) 1.9 N., 96.5 E. Near coast of Sumatra. h:25 km ca. H=22 26 29.6 USCGS					
5.	iP P:N,E,D	NEZ	21	31	39.5	7.	iP iS P:S,W,D	NEZ NE	01	32	46.5 48.8
5.	iP iS P:S,E,D	NEZ EZ	22	54	58.8 09.8	7.	iP iS	NEZ NEZ	01	33	59.1 01.3
6.	P i eS i eL	Z Z Z Z N	01	42	19 48 42 56.5 27.3 03 00	7.	P i i i	Z EZ E N	06	39	42 43.5 40 18 22
39.6 N., 77.8 E. Sinkiang Province, China. h:33 km ca. H=01 33 46.9 USCGS						7.	P i S	NEZ EZ N	07	12	40 41.0 13 13
6.	P. eS e	Z E N	03	21	06 23 00 04	7.	P i i i	EZ NEZ EZ N	08	20	51 53.1 12 13.6
44.3 N., 148.1 E. Kurile Is. h:26 km ca. H=03 18 28.1 USCGS						7.	iP Z, P E i	N N	08	40	24.8 25.2
6.	iP eL P:D	Z N	04	16	10 34 54	51.1 N., 156.7 E. Near coast of Kamchatka. h:32 km ca. H=08 35 54.9 USCGS					
6.	iP Z, P NE iS P:C	NE NE	04	52	06.8 23	7.	iP PcP e	EZ Z N	10	16	06.8 17 16 35 45
6.	iP eL P:S,W,D	NEZ NE	14	14	05.3 33 00	0.3 S., 97.0 E. Near coast of Sumatra. h:25 km ca. H=10 06 49.5 USCGS					
2.2 N., 97.2 E. Near coast of Sumatra. h:25 km ca. H=14 05 00.3 USCGS						7.	P i	NEZ Z	17	07	08 21.3
6.	P i L L	Z Z N E	18	23	30 37 47 00 20	7.	P S i	NEZ Z NE	18	07	01 02.1 02.6
Mag. $5\frac{3}{4}$ - 6 (Mat.) 27.8 N., 56.7 E. Southern Iran. h:109 km ca. H=18 12 40.7 USCGS						7.	iP P:N,E,D	NEZ	18	14	29.6
6.	iP iS P:S,E,C	NEZ NE	20	02	59.4 03 07.3						

Date	Phase	Comp.	Time(GMT)			Date	Phase	Comp.	Time(GMT)		
			h	m	s				h	m	s
7.	iP Z, P NE S L Lq Lr Lr P:C	NE NE Z E E N	20	00	33.3 05 05 07 20 23 08 40 09 05	8.	iP iS P:S,W,C	NEZ NE	19	19	32.7 20 03.0
Mag. $5\frac{3}{4}$ (Mat.) 57.2 N., 163.3 E. Near east coast of Kamchatka. h:20 km ca. H=19 54 51.9 USCGS						Mag. $5\frac{1}{2}$ - $5\frac{3}{4}$ (Mat.) 37.6 N., 140.3 E. Honshu, Japan. h:189 km ca. H=19 18 54.8 USCGS					
7.	P i i eL eL	Z NEZ Z N E	21	26	41.4 48.7 34 20 30	8.	iP i i i S i L L P:D	Z Z NEZ E E N E N	21	41	38.6 39.2 40.5 45.2 45 33 38 46 26 38
Mag. $5\frac{1}{4}$ - $5\frac{1}{2}$ (Mat.) 39.3 N., 73.0 E. Kirghiz - Tadzhik border. h:44 km ca. H=21 17 43.8 USCGS						Mag. $6\frac{1}{2}$ (Pas.) 14.8 N., 145.1 E. Mariana Is. region. h:105 km ca. H=21 36 41.6 USCGS					
8.	P i i i	EZ EZ NEZ E	05	37	47.3 59.9 17.6 34.4	9.	iP i P:S,W,C	NEZ N	00	57	16.0 52.0
8.	iP E, P N i i P:E	E E E	13	23	32.0 39.4 48	9.	iP Z, P NE iS P:D	NEZ N	02	47	31.0 35.0
8.	iP eL P:C	Z NE	16	10	00.5 25 07	9.	iP i P:D	Z Z	07	35	10.2 26
18.2 S., 168.6 E. New Hebrides Is. region. h:120 km ca. H=15 59 49.2 USCGS						Mag. $5\frac{3}{4}$ (Pas.) 36.5 N., 121.3 W. San Benito County, California. h:11 km ca. H=07 23 16.0 USCGS					
8.	ePKP i i PP pPPP i i eSS L L L	NEZ Z E Z Z N Z E N Z	18	19	28 10.0 11.7 46 27 29 00 32 40 41 50 19 10 04 11 26 49	9.	iP P:D	Z	09	31	57.5
Mag. $6\frac{3}{4}$ (Mat.) 38.2 S., 72.7 W. Chile. h:60 km ca. H=17 59 46.7 USCGS						26.0 S., 178.4 E. South of Fiji Is. h:655 km ca. H=09 21 29.0 USCGS					
9.	iP NZ, P E iS i P:N,C	NEZ E NZ	13	22	46.3 07.4 10	29.7 N., 138.2 E. South of Honshu, Japan. h:352 km ca. H=13 20 49.0 USCGS					



Date	Phase	Comp.	Time(GMT)		
			h	m	s
9.	P	NEZ	15	39	24
	S	N		42	48
	i	N			52
	i	E			59
	L	E		43	54
	L	N		44	14
P:N,E,C Mag. 6 $\frac{1}{4}$ (Mat.) 24.1 N., 122.2 E. Near coast of Formosa. h:13 km ca. H=15 34 05.4 USCGS					
9.	iP	Z	15	43	23.4
P:D					
9.	iP Z, P	NE	16	50	13.0
	iS	NE			39
P:D					
9.	PKP 1	Z	17	37	37.3
	i	NE			38.0
	PKP 2	Z			58.7
PKP:C 18.2 S., 70.2 W. Chile - Peru border. h:29 km ca. H=17 17 47.6 USCGS					
9.	P	NEZ	20	00	47
	i	NEZ			50.5
18.6 N., 147.7 E. Mariana Is. region. h:65 km ca. H=19 56 19.0 USCGS					
9.	P	Z	23	00	26
	S	Z			01 11.5
10.	iP	NEZ	02	30	16.4
	e	N			57
P:N,W,D					
10.	P	NZ	02	37	49
	i	Z			50.7
	i	N			51.5
	e	N			39 29
	i	E			35.0
	i	N			40.0
10.	eP	Z	07	01	10
	i	N			56.5
	eS	NE			05 04
	L	N			06 13
	L	E			16
24.1 N., 122.3 E. Near coast of Formosa. h:22 km ca. H=06 57 13.6 USCGS					

Date	Phase	Comp.	Time(GMT)		
			h	m	s
10.	iP	NZ	09	21	46.5
	i	Z			48.2
	S	NEZ			22 07
P:D					
10.	P	NEZ	16	01	49.3
	iS	NEZ			52.7
10.	iP	EZ	17	16	33.0
	i	N			33.4
	eS	NE			17 20
P:C 36.2 N., 141.7 E. Near coast of Honshu, Japan. h:60 km ca. H=17 15 47.7 USCGS					
10.	iP	NEZ	18	22	01.3
	i	N			46
	i	E			51
	i	Z			23 02
P:S,E,D					
10.	eP	Z	19	15	38
	eL	N			19 07
	eL	E			35
10.	P	Z	19	47	26
	i	NEZ			46
	eS	N			53 13
	Lq	N			55 48
	Lq	E			54
	Lr	NE			58 03
	Lr	Z			05
Mag. 6 (Mat.) 0.2 S., 132.9 E. Near coast of New Guinea. h:38 km ca. H=19 40 15.9 USCGS					
11.	iP	Z	00	30	28.1
	i	E			28.3
	i	N			28.4
	S	NE			31 17
P:D 36.7 N., 141.6 E. Off east coast of Honshu, Japan. h:100 km ca. H=00 29 49.2 USCGS					
11.	iP	NZ	11	48	23.7
	i	N			26.4
	i	EZ			26.5
P:N,D					
11.	P	EZ	18	41	17.5
	PcP	Z			42.41.0
P:E,C					

Date	Phase	Comp.	Time(GMT)		
			h	m	s
continued					
8.8 S., 117.4 E. Soembawa I. h:182 km ca. H=18 32 45.0 USCGS					
11.	P	NEZ	21	12	12.3
	S	Z			55.3
11.	P	EZ	21	35	45
	S	NEZ			36 28
11.	P	Z	21	44	56.5
	e	NE			45 01
	i	E			05.0
	i	Z			05.5
	iS	Z			10.0
P:C 49.0					
12.	iP	NZ	07	54	30.2
	i	Z			56 41
P:N,C					
12.	P	NEZ	11	58	32.2
	i	Z			59 09.5
	e	Z			24
	e	Z			36
P:N,E,D					
12.	iP	NEZ	15	04	48.7
	eL	E			07 06
	i	N			15.0
	i	Z			34.3
P:N,E,D 45.9 N., 149.4 E. Kurile Is. h:25 km ca. H=15 02 00.1 USCGS					
12.	iP	NEZ	17	25	10.8
	iPP	Z			27 21.1
	ScP	Z			30 55.6
P:N,E,C 0.3 N., 123.8 E. Northern Celebes. h:122 km ca. H=17 17 55.3 USCGS					
12.	iP Z, P	NE	17	31	41.1
	i	NEZ			42.5
	i	Z			32 03.5
	eS	E			34 43
	e	N			55
	e	E			35 15
	e	Z			25
	eL	E			37 52
48.1 N., 154.7 E. Kurile Is. h:42 km ca. H=17 27 46.5 USCGS					

Date	Phase	Comp.	Time(GMT)		
			h	m	s
12.	iP	NZ	17	55	11.5
	e	E			12
	i	Z			18.3
	eS	NZ			57 39
	L E, eL N				50
P:S,D 23.2 N., 142.4 E. Mariana Is. region. h:64 km ca. H=17 52 02.0 USCGS					
12.	e	NEZ	19	16	27
12.	PKP	Z	22	39	03
	eSKS	E			45 50
	e	E			49.5
	e	Z			49 50
	eL	E	23	06	40
	e	E			14.5
Mag. 6 (Mat.) 13.1 N., 88.9 W. El Salvador. h:122 km ca. H=22 20 33.6 USCGS					
13.	iP	NEZ	05	36	45.4
	S ?	Z			48
13.	iP	Z	07	12	58
13.	iP	EZ	07	30	42.4
	i	EZ			43.2
	i	N			43.4
	i	Z			31 08.9
P:W,C					
13.	iP	EZ	11	31	53.8
	i	N			32 14.2
	e	E			15
P:E,D					
13.	P	Z	15	29	00
	i	Z			06.4
	i	Z			12.4
	i	E			17
	e	Z			30 11
	i	E			31 52.4
	eL	N			32 50
	eL	E			53
27.0 N., 128.3 E. Ryukyu Is. h:197 km ca. H=15 26 11.0 USCGS					
13.	iP	NEZ	16	43	09.6
	iS	NEZ			50 03
	iSS	NE			53 42
	Lq	NE			56 00
	Lr	EZ			57.9



Date	Phase	Comp.	Time(GMT)		
continued			h	m	s
	e	E	17	03	0
	e	Z		04	9
P:S,E,C Mag. $6\frac{1}{2}$ - $6\frac{3}{4}$ (Mat.) 40.1 N., 77.8 E. Sinkiang, China. h:19 km ca. H=16 34 39.1 USCGS					
13.	iP	EZ	23	33	27.5
	i	N			27.9
	iS	NEZ			45.4
	P:D				
14.	iP	NZ	01	35	20.4
	S	NEZ			46
	P:S,D				
14.	iP	NEZ	11	42	56.4
	iS	Z			57.2
	P:N,C				
14.	iP	NZ	12	46	42.9
	eS	N		51	20
	eL	E		52	5
	eL	N		53	05
	P:S,D				
10.2 N., 143.6 E. Mariana Is. h:25 km ca. H=12 41 02.5 USCGS					
15.	iP	NEZ	00	15	41.7
	i	Z		16	15
	S	EZ			24
	e	N			17 30
	P:S,E,D				
Mag. 5 (Mat.) 34.3 N., 141.6 E. Off east coast of Honshu, Japan. h:100 km ca. H=00 14 49.2 USCGS					
15.	iP	NZ	06	31	53.0
	S	NEZ		32	06.4
	P:N,C				
15.	iP	NEZ	08	01	51.4
	S	NZ		02	14
	P:S,E,D				
15.	e	NE	12	17	0
15.	iP	Z	12	35	38.2
	S	E		36	21.7
	P:C				
15.	iP	Z	16	26	49.5
	i	E			49.6
					(cont.)

Date	Phase	Comp.	Time(GMT)		
continued			h	m	s
	i	NEZ	16	27	14
	P:D				
16.	iP	NZ	06	19	06.7
	i	E			07.1
	S	Z		20	26
	P:N,C				
29.9 N., 138.8 E. South of Honshu, Japan. h:387 km ca. H=06 17 21.3 USCGS					
16.	iP	NEZ	08	10	34.2
	S	EZ			52
	P:S,W,C				
16.	iP	NEZ	09	09	28.1
	i	N			31.1
	S	N			49
	P:N,E,D				
16.	iP	NEZ	11	45	40.7
	S	NEZ		49	33
	eL	NE		50	32
	e	Z			33
	eLr	E			51.5
	P:N,E,D				
53.5 N., 158.7 E. Kamchatka. h:27 km ca. H=11 40 40.7 USCGS					
16.	eP	Z	12	13	33
	eS	N		19	48
	e	E			56
	eLq	N		22	12
	Lq	E			49
	Lr	NZ		25	34
	P:N,E,D				
Mag. $5\frac{1}{2}$ - $5\frac{3}{4}$ (Mat.) 3.5 S., 149.5 E. New Ireland region. h:109 km ca. H=12 05 53.8 USCGS					
16.	eP	Z	12	33	08
51.6 N., 130.6 W. Off northwest coast of Vancouver I. h:50 km ca. H=12 22 47.1 USCGS					
16.	P	Z	23	20	21.5
	i	NZ			35.3
	e	Z		22	28.5
	PPP ?	Z			41.5
	P:D				
3.4 S., 135.6 E. Near south coast of New Guinea h:64 km ca. H=23 12 52.2 USCGS					

Date	Phase	Comp.	Time(GMT)			Date	Phase	Comp.	Time(GMT)		
			h	m	s	continued			h	m	s
17.	iP	NEZ	07	52	34.1						
	i	EZ			43.3						
	P:N,E,D										
44.6 N., 150.1 E. Kurile Is. h:25 km ca. H=08 26 54.8 USCGS											
17.	eP	NZ	07	56	04	18.	iP	Z	10	28	29.4
							e	E			29 58
							e	N			30 00
							e	Z			31 19
							e	E			31 19
							P:D				
16.0 S., 175.3 W. Tonga Is. h:289 km ca. H=07 45 24.4 USCGS											
17.	iP	NZ	13	09	54.5	18.	iP	NZ	10	38	21.6
	i	E			55.0		e	E			39 46
	i	N			11 21.5		e	N			47
	eS	E			23		P:S,D				
	L	NE			58						
	P:N,C										
29.6 N., 141.9 E. South of Honshu, Japan. h:141 km ca. H=13 08 10.8 USCGS											
17.	P	NEZ	14	56	39.5	18.	P	EZ	10	55	32
	P:N,E,C						e	NEZ			40
							iS	EZ			56 24
17.	e	N	17	29	5	18.	e	Z	12	14	50
							i	Z			15 06.0
							eL	N			19.5
							eL	E			19.7
17.	iP	NEZ	20	43	27.6	18.	iP	NZ	13	52	06.2
	i	NEZ			35.5		e	N			53 07
	iS Z, S NE				44 19.0		eL	E			14 02.6
	P:N,E,C						P:D				
6.3 S., 131.5 E. Banda Sea. h:67 km ca. H=13 44 08.7 USCGS											
17.	iP Z, P E		20	54	53.0	18.	e	Z	18	16	12
	i	Z			55 28.0		e	Z			33 04
	P:D						e	NE			37.1
							e	E			40.7
17.	iP	NZ	20	58	36.5	18.	eL	NE	20	02	5
	P:S,D						eL	N			11.5
21.3 S., 178.6 W. Tonga Is. region. h:549 km ca. H=20 48 12.5 USCGS											
18.	P	EZ	03	12	53.5	18.	P	Z	22	13	31
	S	NEZ		13	07.6						
1.5 S., 99.5 E. Off coast of Sumatra. h:39 km ca. H=22 04 21.5 USCGS											
18.	P	EZ	05	02	15.6	19.	iP	NEZ	11	18	28.8
	e	N		05	27		i	Z			44.9
	e	E		06	26		S	N			47
	e	N		07	45		i	EZ			49
							P:S,E,D				
18.	P	EZ	05	09	54	19.	PKP 1	Z	11	23	35.6
	e	NZ		10	05		PKP 2	Z		24	04.8
	e	N		18	1		PKP:C				
							18.8 S., 67.4 W. Bolivia. h:60 km ca. H=11 03 45.9 USCGS				
18.	iP	NEZ	08	29	47.7						
	eS	N		32	08						
	L	N		33	40						
	L	E			46						
	P:N,E,D										



Date	Phase	Comp.	Time(GMT)			Date	Phase	Comp.	Time(GMT)		
			h	m	s				h	m	s
19.	P	Z	16	11	18	20.	iP S	NEZ NZ	06	04	02.6 05
19.	iP i S L	NEZ Z NE NE	16	15	02.7 25 56 22	20.	iP iS	NEZ NEZ	06	04	40.1 42.9
P:S,W,C Mag. 6 (Mat.) 44.2 N., 148.0 E. Kurile Is. h:51 km ca. H=16 12 28.7 USCGS						P:W,C 54.7 N., 159.6 E. Kamchatka. h:25 km ca. H=14 15 27.7 USCGS					
19.	iP e	NEZ NZ	16	29	23.2 44.5	20.	iP i S i	NEZ Z Z Z	16	26	08.8 20 33 42
P:S,W,C						P:S,W,D					
19.	P i eS eL	NEZ NEZ N NE	18	19	22.3 23.0 50 00	20.	P i	Z N	19	28	43 10
P:S,W,C 35.1 N., 163.6 E. Kamchatka. h:21 km ca. H=18 13 51.8 USCGS						Z N Z					
19.	P i eS eL	NZ NEZ NE NE	20	22	42.6 43 02 40	20.	eP S eL eL	Z N NE Z	19	31	37 41 33 53 00 04.0
Mag. 5 3/4 (Mat.) 44.6 N., 150.2 E. Kurile Is. h:27 km ca. H=20 19 46.4 USCGS						32.9 S., 178.8 W. Kermadec Is. region. h:58 km ca. H=19 19 29.7 USCGS					
19.	iP S	NEZ NE	21	50	50.6 51 14	20.	iP e	NZ NE	21	48	10.2 10.6
P:N,E,D						P:N,C					
19.	P eS	NZ E	22	10	44 13 02	20.	P e i Lq Lr	Z NE E NE NEZ	21	50	11.8 22 15 17 30 06
44.9 N., 149.5 E. Kurile Is. h:34 km ca. H=22 07 51.2 USCGS						Mag. 6 1/4 - 6 1/2 (Mat.) 15.2 S., 173.7 W. South of Samoa Is. h:25 km ca. H=21 39 07.0 USCGS					
20.	eP S	NEZ NEZ	03	29	45 53	21.	iP Z, P i	NE Z	00	17	11.0 30.0
20.	P	NZ	05	17	45	21.	iP iS P:D	Z NEZ	03	47	30.7 45.5
20.	P e e eL eL	Z N Z E N	05	48	47 48 55 27 00	21.	iP i iS P:D	NEZ E NEZ	07	06	25.7 34 47.6
50.0 N., 155.4 E. Kurile Is. h:71 km ca. H=05 44 34.7 USCGS						P:N,W,C					

Date	Phase	Comp.	Time(GMT)			Date	Phase	Comp.	Time(GMT)		
			h	m	s				h	m	s
21.	iP i iS P:D	Z Z NZ	11	05	46.0 55.5 11.5	22.	iP i S P:S,D	NZ NE NE	15	28	56.0 57 16
21.	iP Z, P e P:C	NE E	14	51	08.0 58 39	22.	iP S P:N,D	NEZ NEZ	16	13	03.5 18.4
21.	iP i S e L P:D	Z NE E E Z	19	34	35.7 36 37 38 56 39 36	22.	iP i i i P:N,C	NZ E N EZ	18	03	18.7 19.2 40 04 06
Mag. 5 1/4 - 5 1/2 (Mat.) 48.1 N., 154.6 E. Kurile Is. h:23 km ca. H=19 30 36.9 USCGS						Mag. 5 3/4 (Mat.) 3.5 S., 150.1 E. New Britain region. h:91 km ca. H=18 59 23.2 USCGS					
21.	iP i S e i i i L L	NEZ NEZ E E NZ Z Z NZ E	20	14	32.2 38.5 36 40 53 54 18 00 26 54 19 36	22.	P PPP S L eL eLr eLr P:C	Z Z NE N E Z N	19	07	03.5 09 08 13 20 15 50 18 34 19 34 40
P:S,W,C Mag. 5 3/4 - 6 (Mat.) 47.7 N., 154.6 E. Kurile Is. h:27 km ca. H=20 10 38.3 USCGS						Mag. 5 3/4 (Mat.) 26.2 N., 129.8 E. Ryukyu Is. h:110 km ca. H=05 14 31.1 USCGS					
21.	iP Z, P PP S eL eL ScS ? eLr P:W,C	NE Z E N E E Z	21	33	50.7 28.0 31 00 30 22 40	22.	iP i i P:C	Z Z E	20	50	12.4 19 51 05
Mag. 5 1/2 - 5 3/4 (Mat.) 51.7 N., 173.9 W. Andreanof Is. h:36 km ca. H=21 26 42.1 USCGS						23. P S			NEZ NE 05 04 48 05 10		
22.	eP ? i e S e e L L	Z Z Z N E NE N Z	00	37	52 08.0 11 14 17 24 10 26	23.	P i i S i i L L	Z Z Z E N Z	05	17	26 36 00 48 10 17 18 50 54



Date	Phase	Comp.	Time(GMT)			
			h	m	s	
23.	iP	NEZ	09	04	36.3	
	i	NEZ			48	
	i	E		05	08	
	S	NE		06	46.3	
	L	Z		07	50	
	L	N		09	28	
	Lr	Z			40	
	L	E			50	
	P:S,W,C Mag. 6 (Mat.) 44.6 N.,150.2 E. Kurile Is. h:44 km ca. H=09 01 41.8 USCGS					
	23.	P	Z	09	16	49
i		Z		17	26.3	
23.	iP	Z	12	20	48.1	
	i	NE			49.3	
	i	Z			53.3	
	i	Z		21	03.8	
	i	Z			11.3	
	S ?	E		23	34	
	e	N			45	
L	Z		24	42		
P:D 44.8 N.,150.6 E. Kurile Is. h:78 km ca. H=12 17 59.7 USCGS						
23.	iP	NZ	14	58	16.3	
	i	Z			29.1	
	i	Z			42.0	
	eS ?	N	15	00	47	
	eL	E		01	10	
	L	Z		03	20	
	P:S,D					
23.	iP	NEZ	15	55	39.3	
	i	N			45	
	i	EZ		56	19	
P:N,E,D						
23.	eP	Z	16	35	12	
	e	E		38	00	
	e	N			18	
	eL	E		39	14	
23.	iP	Z	16	53	53.3	
	i	NE			54	
	i	Z		54	00	
	i	EZ			07.3	
	S	N		56	11	
	e	E			18	
	eL	E			40	
	eL	N		57	00	
	eL	Z			10	
	P:C					

(cont.)

Date	Phase	Comp.	Time(GMT)		
			h	m	s
continued					
44.5 N.,150.1 E. Kurile Is. h:76 km ca. H=16 51 03.6 USCGS					
23.	P	NZ	22	06	14
	i	NEZ			14.8
	S	NEZ		07	59
	i	Z		08	03
28.7 N.,140.5 E. Bonin Is. h:581 km ca. H=22 04 18.6 USCGS					
24.	iP	Z	00	03	34.4
	S	Z			36.6
	i	NE			37.3
P:C					
24.	iP	Z	03	13	16.2
	e	N			16 36
	eL	Z			17 24
P:C					
24.	iP	EZ	04	59	38.4
	i	N			39.2
	PcP	Z	05	01	57.3
	P:W,C				
52.2 N.,173.1 W. Fox Is. h:57 km ca. H=04 52 29.3 USCGS					
24.	eP	Z	08	30	17
	e	E			34 14
24.	e	E	09	17	20
	e	N			40
24.	e	N			21 50
	P:C				
24.	e	E	11	12	33
	24.	e	E	11	37.2
24.		iP Z, P NE		12	30
	i	Z			46
	eS	N			32 49
	eL	NE			33 18
	e	Z			41
	eL	Z			34 33
	P:C				
44.5 N.,150.2 E. Kurile Is. h:76 km ca. H=12 27 39.5 USCGS					
24.	P	Z	12	36	51
	24.	iP Z, P N		13	21
P:C					
29.2 S.,176.7 W. Kermadec Is. h:25 km ca. H=13 09 51.8 USCGS					

Date	Phase	Comp.	Time(GMT)			
			h	m	s	
24.	iP	NEZ	13	24	24.8	
	P:N,E,D					
24.	P	NEZ	23	45	08	
	S	NEZ			17.3	
25.	P	Z	00	17	56	
	e	E			21 54	
	e	NE			22 32	
25.	P	Z	00	21	21	
	i	Z			31	
25.	P	Z	00	31	05	
	i	Z			45	
	i	NE			50	
44.6 N.,150.0 E. Kurile Is. h:72 km ca. H=00 28 15.4 USCGS						
25.	iP	Z	01	20	30.5	
	i	NE			31.2	
	i	Z			47.1	
	i	Z			55.8	
	S	N		22	50	
	i	EZ			56	
	L	NE		23	18	
	L	Z		24	30	
	P:C					
	Mag. 5 1/2 - 5 3/4 (Mat.) 44.5 N.,150.0 E. Kurile Is. h:78 km ca. H=01 17 42.7 USCGS					
25.	iP EZ, P N		02	38	53.6	
	PcS	Z			44 42	
	P:S,W,D					
0.7 S.,124.1 E. Northern Celebes region. h:200 km ca. H=02 31 44.2 USCGS						
25.	iP	EZ	03	42	09.2	
	i	N			09.8	
	i	N			44	
	S ?	NE			46	
P:E,D						
25.	eP	Z	05	05	56	
	e	E			10 36	
25.	iP	Z	05	35	28.5	
	i	NE			36 17.8	
	i	Z			19.8	
P:C						
25.	P	EZ	06	37	45	
	i	EZ			51.5	
	S ?	NE			38 45	

Date	Phase	Comp.	Time(GMT)		
			h	m	s
25.	iP Z, P NE		07	17	25.8
	i	Z			31
	i	Z			38
	i	N			49
	S ?	NE			50
P:C					
25.	e	N	08	32	34
	e	N			40 20
25.	e	E	10	06	32
	25.	eP	Z	11	28
e		E			31 43
eS		NE			38 52
eSS		N			43 56
eL		E			54 12
Mag. 5 1/2 - 5 3/4 (Mat.) 32.7 S.,178.5 W. Kermadec Is. region. h:45 km ca. H=11 16 41.4 USCGS					
25.	iP	NEZ	13	35	18.0
	S	E			41
P:S,E,D					
25.	eP	Z	13	45	45
	i	N			46 03.3
	i	Z			09.3
25.	e	N	14	00	00
	e	E			01 38
25.	P	N	15	02	50
	i	Z			51
	S	Z			03 15
25.	i	NE			16.3
	25.	iP	Z	15	55
P:C					
25.	e	E	20	04	26
	e	N			41
25.	P	Z	22	15	35
	25.	iP	Z	23	43
i		NZ			40.8
e		N			46 36
P:D					
27.9 N.,129.3 E. Ryukyu Is. h:25 km ca. H=23 40 34.3 USCGS					
26.	P	Z	00	41	00
	eS	N			43 45
	e	E			44 20
43.6 N.,151.0 E. Kurile Is. h:100 km ca. H=00 38 07.4 USCGS					



Date	Phase	Comp.	Time(GMT)		
			h	m	s
26.	P	Z	01	43	31
	i	NEZ			42
26.	P	Z	06	28	35
	eS	N		34	50
	e	E		35	25
	eL	E		39	37
	eL	N		41	36
Mag. 5 - 5 1/4 (Mat.) 5.7 S., 151.1 E. New Britain. h: 54 km ca. H=06 20 23.5 USCGS					
26.	iP	Z	06	40	17.0
	i	NE			17.2
	i	N			42
P:C					
26.	iP	NEZ	07	41	50.0
	i	Z		42	05
	S	NE		43	55
	Lq	N		44	08
	Lq	E			13
	i	Z			16
	Lr	Z		45	00
P:N,E,D Mag. 5 3/4 (Mat.) 44.6 N., 149.9 E. Kurile Is. h: 20 km ca. H=07 38 54.1 USCGS					
26.	iP	Z	10	18	52.8
	i	N			53.0
	S	N		20	12.5
	i	E			14.5
P:D					
26.	iP	NEZ	12	20	27.5
	i	NZ		21	35
P:N,E,D					
26.	eP	Z	12	41	54
	e	N		44	40
	e	E		46	46
26.	iP	NZ	17	00	41.0
	i	E			41.3
P:N,C 0.2 N., 124.1 E. Northern Celebes. h: 135 km ca. H=16 53.29.4 USCGS					
26.	P	NEZ	19	35	27
	eS	E			49
	e	N		37	42
	L	E			50
		N		38	22
(cont.)					

Date	Phase	Comp.	Time(GMT)		
			h	m	s
continued					
	Lr	Z	19	40	16
44.6 N., 150.1 E. Kurile Is. h: 51 km ca. H=19 32 34.2 USCGS					
27.	iP	Z, P NE	01	22	32.7
	i	Z			37.8
	i	N			53
P:C					
27.	iP	Z, P NE	07	26	35
	i	NE			57
27.	iP	Z	17	54	55.5
	i	Z		55	05.5
P:D					
27.	iPKP	Z	18	11	32.5
PKP:C 12.9 S., 75.1 W. Peru. h: 124 km ca. H=17 52 16.5 USCGS					
27.	iP	NEZ	20	25	10.0
	i	NE			30.0
	S ?	N			40
P:N,W,C					
28.	iP	Z, P NE	02	21	47.4
	i	Z			22 13
	S	E			23 18
P:D					
28.	P	Z	03	58	44
	i	NEZ			45
	i	Z		59	04
	i	NE			07
28.	iP	EZ, P N	04	13	12.1
	i	E			20
	S	NE			25
P:W,C					
28.	e	N	07	34	07
28.	PKP 1	Z	09	02	42
	PKP 2	Z			53.6
	sPKP	Z		03	17
21.8 S., 68.0 W. Southern Bolivia. h: 132 km ca. H=08 42 55.9 USCGS					
28.	iP	NEZ	10	11	07.7
	S	NEZ			20
P:W,C					
28.	iP	Z	19	24	45.8
(cont.)					

Date	Phase	Comp.	Time(GMT)		
			h	m	s
	i	Z	19	25	23
	eL	N			37 22
P:C					
28.	iP	Z, P NE	20	46	27.1
P:C 17.7 S., 178.7 W. Fiji Is. h: 595 km ca. H=20 36 25.3 USCGS					
28.	P	NEZ	22	17	09
	i	Z			13
	i	E			18.6
	i	Z			57
	S ?	E		20	30
	i	N			31
29.	iP	NEZ	00	52	55.2
	iS	NEZ		53	12.1
P:S,W,D					
29.	iP	NEZ	09	30	43.2
	eS	E		39	54
	e	Z		51	37
	L	E		54	40
	L	N		55	37
P:N,E,D Mag. 5 1/2 - 5 3/4 (Pas.) 40.6 N., 127.5 W. Off coast of northern California. h: 26 km ca. H=09 19 28.3 USCGS					
29.	P	NZ	09	40	24
	i	Z		43	15
	S	E		49	36
71.3 N., 7.4 W. Jan Mayen I. region. h: 14 km ca. H=09 29 09.5 USCGS					
29.	P	Z	10	51	15.8
	eS	N		55	53
	e	E		56	10
	e	E		58	28
	e	N			54
	L	E		11 01	05
	L	Z			20
P:C 41.8 N., 104.5 E. Outer Mongolia. h: 25 km ca. H=10 45 39.1 USCGS					
29.	P	Z	11	23	44.5
	i	N		24	13
P:C					

Date	Phase	Comp.	Time(GMT)		
			h	m	s
29.	P	Z	12	19	20.6
	i	Z			23.6
	iS	NEZ			33.1
P:C					
29.	iP	NZ, P E	21	20	39.9
	e	N			23 41
	e	E			49
	eL	E		24	16
P:N,D					
30.	eL 1	N	08	25	40
	eL	E			52
	eL 2	N		32	34
Mag. 5 1/4 - 5 1/2 (Mat.) 52.0 N., 31.9 W. North Atlantic Ocean. h: 38 km ca. H=07 33 53.5 USCGS					
30.	eP	Z	10	40	56
	i	Z		41	10
30.	iP	Z, P NE	11	03	28.1
	i	Z			44.6
	eS	N			05 44
	eL	N			06 14
P:C 45.8 N., 150.2 E. Kurile Is. h: 100 km ca. H=11 00 46.8 USCGS					
30.	iP	Z, P NE	11	18	08.9
	i	NEZ			13
	e	NE			50
	S	NZ		20	16
	i	Z			28
	L	N			43
	L	E		21	10
	L	Z			23
	Lr	Z		23	00
P:S,D Mag. 5 1/2 - 5 3/4 (Mat.) 44.6 N., 149.7 E. Kurile Is. h: 70 km ca. H=11 15 19.8 USCGS					
30.	iP	Z, P NE	14	59	13.5
	S	NE		15	08 16
	eSS	E			12 38
	Lq	E			15 30
	Lq	N			40
	Lr	Z		19	12
	Lr	E			28
P:C Mag. 5 3/4 - 6 (Mat.)					



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

15.3 S., 174.4 W.  
Samoa Is. region.

h: 25 km ca.

H=14 48 11.5 USCGS

30. eP Z 17 41 51  
eS N 51 22  
eL N 18 00 00

40.7 N., 127.2 W.

Off coast of northern California.

h: 44 km ca.

H=17 30 38.6 USCGS

30. iP NEZ 18 48 05.8  
i Z 20  
iS NEZ 50.1  
P:S,W,D

30. iP Z, P NE 21 29 52.0  
i Z 54  
i NEZ 58.5  
S NE 30 17  
P:D

30. iP NEZ 21 46 26.5  
S NZ 47 14  
P:N,W,D

30. P EZ 21 56 21  
i N 55  
i EZ 59

30. P Z 22 04 02  
S NE 05 35  
P:C

Takeshi Honda

Director