International Seismological Centre

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SEISMOLOGICAL BULLETIN

OF

MATSUSHIRO

MAY , JUNE

1965

Matsushiro Seismological Obsrvatory
Matsushiro-machi , Nagano-shi
Nagano-ken , Japan

International Seismological Centre

Matsushiro Seismological Observatory , Japan

Seismological Bulletin

Latitude	36° 32′ 30″N.	
Longitude	138° 12′ 32″E.	
Elevation	440 M.	

Instrumental Constants

Instruments	Comp.	Period (sec)		Damping ratio		Magnification
Benioff	N	T_1= 1.0	T_2= 0.23	h_1= 0.68	h_2= 1.7	103,000 (max)
Seismograph	E	T_1= 1.0	T_2= 0.22	h_1= 0.70	h_2= 1.6	106,000 (max)
(Short Period)	Z	T_1= 1.0	T_2= 0.21	h_1= 0.72	h_2= 1.2	131,000 (max)
Benioff	N	T_1= 1.0	T_2= 70	h_1= 0.68	h_2= 5.9	7,330 (max)
Seismograph	E	T_1= 1.0	T_2= 62	h_1= 0.70	h_2= 5.6	8,640 (max)
(Long Period)	Z	T_1= 1.0	T_2= 84	h_1= 0.72	h_2= 7.3	7,590 (max)
Short Period Seismograph	Z	T_1= 1.0	T_2= 2.82	h_1= 1.4	h_2= 1.2	32,000 (max)
Galitzin	N	T_1= 15	T_2= 100	h_1= 1	h_2= 1.2	1,350 (max)
Seismograph	E	T_1= 15	T_2= 100	h_1= 1	h_2= 1.1	1,640 (max)
	Z	T_1= 7.5	T_2= 100	h_1= 0.76	h_2= 0.37	860 (max)
Wood-Anderson	N	0.8		0.8		1,050
Seismograph	E ,	0.8		0.8		1,200
1000 kg						
Long Period	N	33.0		0.60		100
Seismograph	E	30.0		0.62		100

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Date	Phase	Comp.	Time(GMT) h m s
1.	P	N	00 53 19.2
	i	Z	19.4
	i	E	19.6
	S	NEZ	39
1.	iP Z, P N		01 26 42.7
	i	Z	54.9
	eS	E	27 52
	e	N	57
	eL	E	28 27
	P: C		
1.	iP Z, P N		02 07 14.8
	eS	NE	14 43
	eL	E	21 29
	eL	N	22 04
	P: S, C		
	60.4 N., 145.9 W.		
	Southern Alaska.		
	h: 13 km ca.		
	H= 01 58 02.9		USCGS
1.	iP NE, P Z		02 17 05.0
	S	E	44
	P: N, E, C		
	33.4 N., 138.7 E.		
	South of Honshu, Japan.		
	h: 230 km ca.		
	H= 02 16 11.4		USCGS
1.	eP	Z	02 46 43
1.	eP	Z	03 02 04
	S	NEZ	11
1.	iP	NZ	03 54 48.1
	iS	E	55 13.1
	P: S, D		
1.	iP	EZ	04 12 53.0
	i	N	53.5
	e	NZ	13 22
	e	E	24
	eS	E	14 04
	eL	E	28
	eL	Z	30
	P: E, D		
	Mag. 5.3 (Mat.)		
	30.9 N., 141.7 E.		
	South of Honshu, Japan.		
	h: 38 km ca.		
	H= 04 11 19.1		USCGS
1.	eP	Z	05 09 57
	2.6 S., 126.2 E.		
	Ceram Sea.		
	h: 33 km ca.		
	H= 05 02 20		USCGS
1.	eP	Z	05 50 30
1.	eP	Z	06 08 38
	S	NE	09 08
1.	iP	NZ	13 08 07.0
	iPcP	Z	11 46.7
	eS	NE	12 25
	i	E	13 49
	ScP	NEZ	15 25
	ScS	N	19 12
	P: S, D		
	Mag. 5½-5¾ (Mat.)		
	12.3 N., 143.7 E.		
	South of Mariana Is.		
	h: 5 km ca.		
	H= 13 02 44.5		USCGS
1.	iP	NEZ	15 47 06.4
	S	NEZ	29
	P: S, E, D		
1.	P	N	19 11 38
	e	EZ	43
	eS	N	13.7
	e	E	14.8
	29.9 N., 127.9 E.		
	East China Sea.		
	h: 114 km ca.		
	H= 19 09 10.1		USCGS
1.	iP	NEZ	19 27 26.7
	S	NEZ	47
	P: N, W, C		
1.	eP	Z	20 00 24
	e	Z	50
	e	E	51
	53.4 N., 172.6 W.		
	Andreanof Is., Aleutian Is.		
	h: 33 km ca.		
	H= 19 53 16		USCGS
1.	P	NZ	20 09 52
	i	Z	10 07
	0.3 N., 127.0 E.		
	Halmahera.		
	h: 33 km ca.		
	H= 20 02 41		USCGS
1.	P	Z	20 42 15
	e	NE	45 19ca.
	34.9 N., 135.0 E.		
	Near south coast of Honshu, Japan.		
	h: 525 km ca.		
	H= 20 41 02		USCGS
1.	iP	NZ	21 37 04.1
	i	E	04.5
	e	E	40 43

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Date	Phase	Comp.	Time(GMT) h m s	Date	Phase	Comp.	Time(GMT) h m s
	i	N	21 41 07.4		L	E	07 19 31
	eS?	E	44 05		Mag. 5.3 (Mat.)		
	e	N	08		28.9 N., 128.9 E.		
	eL	N	50 13ca.		Ryukyu Is.		
	P: S, C				h: 30 km ca.		
	Mag. 5¼ (Mat.)				H= 07 13 42		USCGS
	60.4 N., 146.0 W.						
	Southern Alaska.			2.	P	Z	09 09 14
	h: 33 km ca.				e	Z	22
	H= 21 27 54.4		USCGS		51.9 N., 142.9 E.		
					Sakhalin I.		
1.	eP?	Z	23 45 50		h: 5 km ca.		
					H= 09 05 32.0		USCGS
1.	eP	Z	23 51 18				
	e	N	28	2.	eP	Z	09 15 20
	i	E	52 09		i Z, e NE		24
2.	P	NEZ	00 04 56	2.	iP	NZ	11 02 26.5
	i	Z	05 09		P: S, D		
	S	E	06 08		20.3 S., 178.9 W.		
	L	E	33		Fiji Is. region.		
	Mag. 5.1 (Mat.)				h: 581 km ca.		
	30.9 N., 141.8 E.				H= 10 52 13.5		USCGS
	South of Honshu, Japan.						
	h: 33 km ca.			2.	iP	Z	12 21 41.0
	H= 00 03 22.2		USCGS		i	E	41.6
					eS	E	22 07
2.	P	NEZ	00 36 23.5		i	N	08.1
	eS	E	37 33		P: D		
	L	E	57				
	30.9 N., 141.8 E.			2.	iP	NEZ	12 58 39.7
	South of Honshu, Japan.				eS	Z	58
	h: 33 km ca.				i	E	59 03
	H= 00 34 49.8		USCGS		P: N, E, D		
2.	iP	Z	00 56 50.1	2.	P	Z	14 14 51
	i	N	50.5		e	Z	59
	P: C				e	E	16 21
					e	N	37
2.	P	NZ	02 16 01		e	Z	48
	i	E	02.5		e	E	17 13
	eS	NE	17 15		i	N	16
2.	PKP	Z	06 07 25	2.	eP	Z	14 28 17
	pPKP	Z	53		S	NZ	39
	19.8 S., 69.5 W.				i	Z	43
	Northern Chile.						
	h: 117 km ca.			2.	P	Z	22 36 00
	H= 05 47 43.9		USCGS		i	NEZ	03
2.	eP	Z	06 32 04	3.	PKP1	Z	01 29 47
	eS	E	20		ePKP2	Z	30 19
	i	NE	23		32.5 S., 70.6 W.		
					Chile-Argentina border		
2.	P	Z	07 16 18		region.		
	e	NZ	28		h: 77 km ca.		
	i	E	30		H= 01 09 31.5		USCGS
	eS	N	18 22				
	L	N	19 16	3.	iP	NZ	01 41 06.3

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Date	Phase	Comp.	Time(GMT) h m s	
	eS	Z	01 42 18	
	e	NE	19	
	P: N, C			
3.	P	Z	03 00 10	
	1.7 S., 126.3 E.			
	Molucca Sea.			
	h: 10 km ca.			
	H= 02 52 38			USCGS
3.	PKP	Z	04 16 42	
	12.1 S., 14.8 W.			
	South Atlantic Ridge.			
	h: 33 km ca.			
	H= 03 57 02			USCGS
3.	P	Z	07 58 48	
	eS	NE	59 10	
3.	ePS	E	10 30 43	
	e	E	37.0	
	eL	E	50 45	
	Mag. 6½ (Mat.)			
	13.5 N., 89.3 W.			
	El Salvador.			
	h: 23 km ca.			
	H= 10 01 35.2			USCGS
3.	P	Z	16 06 31	
	i	N	38	
	e	Z	40	
	18.5 N., 146.0 E.			
	Mariana Is.			
	h: 123 km ca.			
	H= 16 02 14.5			USCGS
3.	PKP	Z	16 28 49	
	e	Z	57	
	pPKP	Z	29 12	
	24.2 S., 67.8 W.			
	Chile-Argentina border region.			
	h: 114 km ca.			
	H= 16 09 09.0			USCGS
3.	eP	Z	17 25 00	
3.	iP	NZ	17 47 12.0	
	P: N, D			
	52.0 N., 175.8 E.			
	Rat Is., Aleutian Is.			
	h: 42 km ca.			
	H= 17 40 58.4			USCGS
3.	iP NZ, P	E	18 12 39.3	
	iS	Z	40.4	
3.	P	Z	19 54 12.9	

Date	Phase	Comp.	Time(GMT) h m s	
3.	P	NZ	21 03 34	
	i	NZ	41	
	e	N	04 39	
	31.5 N., 141.1 E.			
	South of Honshu, Japan.			
	h: 88 km ca.			
	H= 21 02 12.0			USCGS
3.	eP	Z	23 12 37	
3.	P	Z	23 30 10	
4.	P	Z	00 09 38	
	e	Z	48	
	5.6 S., 102.0 E.			
	Southern Sumatra.			
	h: 40 km ca.			
	H= 00 00 19.3			USCGS
4.	eP	Z	00 33 26	
4.	P	Z	02 09 24	
	eL	E	18.1	
	1.7 S., 138.6 E.			
	Near north coast of West New Guinea.			
	h: 48 km ca.			
	H= 02 02 14			USCGS
4.	P	Z	02 26 02	
	i	Z	15	
	26.2 N., 126.3 E.			
	Ryukyu Is.			
	h: 95 km ca.			
	H= 02 22 39.1			USCGS
4.	eP	Z	05 24 44	
	i	E	25 06	
	0.7 N., 125.6 E.			
	Molucca Passage.			
	h: 60 km ca.			
	H= 05 17 36.9			USCGS
4.	e	E	08 02 16ca.	
	eL	E	05 57	
4.	eP	Z	08 02 51	
	e	NZ	03 05	
	30.0 N., 127.2 E.			
	East China Sea.			
	h: 75 km ca.			
	H= 08 00 23			USCGS
4.	P	Z	08 42 59	
	eL	NE	57 16	
	Mag. 6-6¼ (Mat.)			
	41.7 N., 79.4 E.			
	Kirgiz-Sinkiang border region.			
	h: 6 km ca.			
	H= 08 34 39.8			USCGS

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Date	Phase	Comp.	Time(GMT) h m s
4.	iP	NZ	08 47 51.4
	i	E	51.8
	P: N, C		
	7.3 S., 129.3 E.		
	Banda Sea.		
	h: 155 km ca.		
	H= 08 39 57.6		USCGS
4.	P	EZ	10 42 34.7
	S	NZ	39
4.	PKP	Z	12 30 14
	16.5 S., 73.2 W.		
	Near coast of Peru.		
	h: 78 km ca.		
	H= 12 10 41.1		USCGS
4.	P	Z	14 54 33
	S	E	55
4.	P	NZ	15 14 22
	S	NEZ	46
4.	P	NZ	18 15 24
	20.1 S., 173.9 W.		
	Tonga Is.		
	h: 33 km ca.		
	H= 18 03 57.7		USCGS
4.	eP	NEZ	22 40 05
	eS	E	41 16
	eL	N	53
	eL	E	55
	32.2 N., 141.2 E.		
	South of Honshu, Japan.		
	h: 175 km ca.		
	H= 22 38 51		USCGS
5.	iP	NZ	01 15 44.2
	i	E	44.5
	i	Z	56
	S	E	16 54
	L	E	17 20
	P: N, C		
5.	eP	Z	02 17 01
	i	N	11.4
	e	E	15
	e	N	34
5.	eP	Z	03 02 19
	e	NE	05 30
5.	iPKP	Z	03 20 26.5
	P: D		
	20.5 S., 69.5 W.		
	Northern Chile.		
	h: 96 km ca.		
	H= 03 00 43.4		USCGS

Date	Phase	Comp.	Time(GMT) h m s
5.	eP	EZ	07 20 27
	eS	E	29 28
	eL	E	37 03
	eL	N	08
	17.0 S., 176.9 W.		
	Fiji Is. region.		
	h: 33 km ca.		
	H= 07 09 29.3		USCGS
5.	iP	Z	08 40 14.0
	i	NE	14.4
	e	E	41 30
	P: C		
5.	iP	Z	09 15 29.8
	P: C		
5.	eP	Z	09 42 25
	19.9 S., 174.1 W.		
	Tonga Is.		
	h: 33 km ca.		
	H= 09 31 00		USCGS
5.	P	Z	12 54 39
	i	Z	49
5.	iP	NZ	13 16 54.4
	S	NZ	18 09
	S	E	10
	P: S		
5.	P	Z	17 47 51.5
	eS?	E	50 34
	e	N	53
	L	E	51 04
	L	Z	21
	29.3 N., 128.5 E.		
	East China Sea.		
	h: 61 km ca.		
	H= 17 45 18.1		USCGS
5.	eP	Z	18 03 50
	e	N	04 11
	eS?	E	06 31
	L	E	07 16
	29.1 N., 128.5 E.		
	East China Sea.		
	h: 33 km ca.		
	H= 18 01 13.6		USCGS
5.	P	NZ	21 35 59
	i	Z	36 11.7
	e	E	37 30
	42.9 N., 145.7 E.		
	Hokkaido, Japan.		
	h: 33 km ca.		
	H= 21 33 54.9		USCGS
5.	eP	N	21 37 33
	eS?	Z	38 13
	i	E	15

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Date	Phase	Comp.	Time(GMT) h m s
5.	iP Z, P N		23 08 04.9
	eS	E	13 00ca.
	eL	N	14.0
	eL	E	14 12
	P: C		
	52.6 N., 173.5 E.		
	Near Is., Aleutian Is.		
	h: 32 km ca.		
	H= 23 02 01.7		USCGS
5.	P	Z	23 28 23
	i	Z	25.4
	i	Z	48
	eS	E	32 30
	eL	E	33 51
	Mag. 5-5¼ (Mat.)		
	14.7 N., 146.2 E.		
	Mariana Is.		
	h: 56 km ca.		
	H= 23 23 24.9		USCGS
6.	iP	Z	01 23 41.7
	P: C		
6.	iP	Z	01 52 25.6
	P: C		
	17.7 S., 179.0 W.		
	Fiji Is. region.		
	h: 528 km ca.		
	H= 01 42 22.0		USCGS
6.	eP	Z	02 25 43
	i	Z	50
6.	ePKP	Z	02 44 55
	25.0 S., 68.4 W.		
	Chile-Argentina border region.		
	h: 90 km ca.		
	H= 02 25 12.0		USCGS
6.	eP	EZ	04 48 19
	i	Z	33
	S	N	42
6.	P	Z	05 23 53
	i	N	24 00
	e	E	10
	e	Z	15
6.	iP	NEZ	08 09 29.4
	iS	NE	31.6
	P: S, W, D		
6.	P	Z	10 02 11
	15.5 S., 167.6 E.		
	New Hebrides Is.		
	h: 97 km ca.		
	H= 09 52 23.4		USCGS

Date	Phase	Comp.	Time(GMT) h m s
6.	iP	EZ	10 46 49.3
	i	N	50.2
	P: W, D		
6.	iP	Z	13 02 03.3
	i	E	03.6
	e	Z	03 38
	P: D		
6.	iP	NZ	14 32 02.0
	i	NEZ	03
	i	Z	16.4
	PcP	Z	33 50
	ScP	Z	37 38
	S	N	38 25
	e	N	41 04
	eL	E	43 05
	L	N	45 32
	P: N, C		
	Mag. 5½ (Mat.)		
	6.1 S., 149.1 E.		
	New Britain region.		
	h: 74 km ca.		
	H= 14 24 04.3		USCGS
6.	eP	Z	14 55 26
6.	eP	Z	16 42 50
6.	eP	Z	18 42 15
	eS	NEZ	38
6.	iP	NZ	23 19 46.0
	iS	Z	47.2
	P: S, C		
7.	iP	NZ	02 34 10.5
	i	E	10.8
	eL	E	40 14
	P: S, D		
	13.9 N., 145.4 E.		
	Mariana Is.		
	h: 57 km ca.		
	H= 02 29 03.9		USCGS
7.	P	Z	07 34 07.7
	i	E	18
	i	Z	20.2
	e	NE	36 20
	e	Z	37 04
	eL	E	20ca.
	30.2 N., 129.0 E.		
	East China Sea.		
	h: 131 km ca.		
	H= 07 31 46.5		USCGS
7.	P	Z	12 18 01
	17.5 S., 179.1 W.		
	Fiji Is. region.		

(cont.)

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Date	Phase	Comp.	Time(GMT) h m s
	h: 546 km ca.		
	H= 12 07 59		USCGS
7.	ePKP?	Z	13 22 41
	i	Z	44.5
	i	E	44.8
	e	N	23 31
	e	Z	32
	P: D		
	56.0 S., 27.6 W.		
	South Sandwich Is. region.		
	h: 102 km ca.		
	H= 13 02 24.5		USCGS
7.	eP	Z	15 55 27
	eS?	N	16 06 00ca.
	eL	N	16 56
	eL	E	17 00
	eL	N	22 31ca.
	eL	E	23 12
	eL	Z	27
	Mag. $5\frac{1}{2}$ (Mat.)		
	32.5 S., 178.2 W.		
	South of Kermadec Is.		
	h: 33 km ca.		
	H= 15 43 23.0		USCGS
7.	eP	NZ	16 44 34
	i	NZ	50
	e	E	55 04
	eL	E	17 06 00ca.
	eL	N	05
	eL	N	11 39
	Mag. $5\frac{1}{2}$-$5\frac{3}{4}$ (Mat.)		
	32.4 S., 178.3 W.		
	South of Kermadec Is.		
	h: 33 km ca.		
	H= 16 32 30.6		USCGS
7.	eP	Z	17 04 10
	32.5 S., 178.2 W.		
	South of Kermadec Is.		
	h: 33 km ca.		
	H= 16 52 11.9		USCGS
7.	iP EZ, P N		17 10 23.2
	S	NE	40
	P: E, D		
7.	eP	Z	18 00 54
	eS	NE	01 21
7.	P	Z	18 02 23.5
	i	Z	37
	S?	N	03 29
7.	eP	NEZ	20 36 07
	S	NEZ	20
7.	P	Z	21 30 46
7.	P	Z	22 02 41
	e	NZ	03 29
	e	E	34
7.	iP	Z	23 09 54.4
	i	E	57
	eS	E	11 18
	P: D		
8.	PKP1	EZ	00 16 00
	i	Z	12.1
	iPKP2	Z	31.8
	PKP2	N	33
	ePP	Z	19 45
	22.2 S., 68.5 W.		
	Northern Chile.		
	h: 84 km ca.		
	H= 23 56 11.6		USCGS
8.	iP	Z	01 22 19.2
	S	E	38
	i	Z	48
	P: C		
8.	P	NZ	03 10 47
	PcP	Z	14 31
	S	E	58
	i	NE	15 13
	eL	E	16 30
	18.4 N., 120.4 E.		
	Luzon, P. I.		
	h: 56 km ca.		
	H= 03 05 38.5		USCGS
8.	P	NEZ	06 44 04
	eS	N	45 00
8.	P	NZ	07 53 01
	iS	E	45.4
8.	P	Z	08 05 19
	e	E	31
	eS	E	06 32
8.	iP	NZ	08 36 36.5
	iS	Z	40.0
	iS	NE	40.6
	P: S, C		
8.	PKP	Z	11 52 46
	i	Z	54.2
	i	Z	53 09.1
	i	N	11.6
	e	Z	57 09
	28.0 S., 70.8 W.		
	Near coast of northern Chile.		
	h: 35 km ca.		
	H= 11 32 57.1		USCGS

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Date	Phase	Comp.	Time(GMT) h m s
8.	eP	EZ	12 34 40
	eS	NE	35 16
8.	eP	Z	14 41 29
	i	N	33.5
	eS?	E	42 40
	eS?	N	41
	i	E	54
8.	P	NEZ	16 29 14
	i	Z	22
	e	N	37
	e	NE	49
8.	eP	Z	19 16 46
	eL	E	26 06
	1.8 S., 141.8 E.		
	New Guinea region.		
	h: 33 km ca.		
	H= 19 09 11		USCGS
8.	eP	Z	19 48 15
	e	Z	29
8.	eP	Z	20 17 45
	e	Z	18 21
8.	iP	Z	22 00 44.6
	S	N	01 17
	e	E	24
	i	N	26
	P: C		
9.	P	Z	04 08 11
	eS?	E	12 44
	eL	N	16 56
	12.3 N., 144.0 E.		
	South of Mariana Is.		
	h: 23 km ca.		
	H= 04 02 50.5		USCGS
9.	iP	NZ	09 29 24.9
	iS	NZ	31.3
	P: N, C		
9.	iP	Z	09 30 15.4
	iS	NZ	21.8
	P: C		
9.	iP	Z	10 10 35.5
	iS	NZ	42.1
9.	e	NE	10 35 53
9.	eP	Z	11 22 55
	S	NZ	23 15
9.	e	E	13 27 50
9.	P	NZ	13 40 01

(cont.) -7-

Date	Phase	Comp.	Time(GMT) h m s
	eL	E	13 49 21
	3.0 S., 139.6 E.		
	Near north coast of west New Guinea.		
	h: 37 km ca.		
	H= 13 32 34.1		USCGS
9.	eP	Z	16 18 28
9.	P	NZ	17 32 07
	eS	E	30
	i	Z	33
	i	NZ	34
9.	P	Z	17 44 44
9.	eP	Z	19 32 28
	S	NZ	33 17
9.	iP	NZ	20 52 32.0
	eS	N	53 41
	P: S, D		
9.	iP	Z	21 47 51.5
	e	N	48 19
	e	Z	38
	P: D		
9.	eP	Z	22 21 04
	56.6 N., 152.8 W.		
	Kodiak I. region.		
	h: 33 km ca.		
	H= 22 12 13		USCGS
9.	iP EZ, P N		22 28 28.0
	S	N	56
	e	Z	29 14
	P: S, E, D		
9.	P	EZ	22 35 12
	i	Z	21
	i	E	22
	e	Z	41 23
	eL	E	46 22
	eL	N	39
	6.4 S., 148.0 E.		
	East New Guinea region.		
	h: 63 km ca.		
	H= 22 27 09.3		USCGS
9.	P	Z	23 47 24
	eS	NZ	49
10.	eP	EZ	00 01 48
	23.4 S., 179.8 W.		
	South of Fiji Is.		
	h: 555 km ca.		
	H= 23 51 22.6		USCGS

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Date	Phase	Comp.	Time(GMT) h m s
10.	P	NZ	00 04 44
	i	EZ	44.7
	i	N	45.0
	e	E	06 49
	eL	NE	08 48ca.
	29.1 N., 131.6 E.		
	Ryukyu Is. region.		
	h: 33 km ca.		
	H= 00 02 30		USCGS
10.	eP	Z	00 35 10
	eS?	E	41
	i	N	49
10.	P	Z	03 27 41
	i	N	28 08
10.	iP	Z	05 02 05.5
	S	N	29
	P: C		
10.	iPKP	Z	08 54 54.9
	pPKP	Z	55 25
	P: D		
	17.3 S., 70.9 W.		
	Near coast of Peru.		
	h: 121 km ca.		
	H= 08 35 21.1		USCGS
10.	P	NEZ	16 29 04
	i	NE	35
	e	Z	40
10.	iP	NEZ	16 51 59.3
	iS	NE	52 24.7
	P: N, E, D		
10.	P	Z	19 23 34
	i	NE	24 06
11.	P	Z	01 15 03
	45.4 N., 150.2 E.		
	Kurile Is.		
	h: 69 km ca.		
	H= 01 12 04		USCGS
11.	eP	Z	03 07 27
	44.0 N., 147.8 E.		
	Kurile Is.		
	h: 34 km ca.		
	H= 03 04 58		USCGS
11.	eP	Z	06 48 13
	49.8 N., 77.9 E.		
	Eastern Kazakh, SSR.		
	h: 0 km ca.		
	H= 06 39 57.8		USCGS
11.	iP	EZ	09 35 02.8

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Date	Phase	Comp.	Time(GMT) h m s
	iS	E	09 35 47.8
	i	N	49
	P: E, D		
11.	e	E	12 16 41
	e	E	18 05
	51.7 N., 174.9 E.		
	Near Is., Aleutian Is.		
	h: 30 km ca.		
	H= 12 04 36		USCGS
11.	iP	Z	12 46 31.2
	eS	N	48 36
	P: C		
11.	P	Z	14 36 41
11.	P	NZ	15 52 17
	i	Z	27
	e	E	54 16
11.	P	Z	17 46 31
	i	E	31.6
	i	N	31.8
	eS	E	53 40
	e	N	46
	eL	E	18 02 30
	Mag. 5¼ (Mat.)		
	61.4 N., 149.6 W.		
	Southern Alaska.		
	h: 58 km ca.		
	H= 17 37 38.3		USCGS
11.	iP	Z	17 51 15.5
	S	NZ	36
	P: C		
11.	P	Z	19 12 13
	S	Z	37
	i	N	38
11.	iP	Z	19 47 56.8
	S	NE	48 16
11.	iP	EZ	22 31 59.2
	S	Z	32 04
	P: W, C		
12.	iP	NEZ	00 28 50.5
	S	NE	29 14
	P: S, W, C		
	37.7 N., 139.2 E.		
	Honshu, Japan.		
	h: 180 km ca.		JMA
12.	iP E, P Z		01 07 27.5
	S	E	55
	P: W		

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Date	Phase	Comp.	Time(GMT) h m s	
12.	P	Z	03 34 21	
12.	P	Z	04 35 35	
12.	P	Z	05 59 00	
	S	N	38	
12.	P	Z	06 55 22	
	18.4 S., 178.0 W.			
	Fiji Is. region.			
	h: 534 km ca.			
	H= 06 45 12		USCGS	
12.	P	Z	07 13 01	
	i	EZ	11	
12.	P?	Z	07 36 05	
12.	iP	Z	08 13 24.2	
	i	N	24.5	
	eS	E	19 22	
	eL	E	23 14	
	3.5 S., 137.9 E.			
	West New Guinea.			
	h: 78 km ca.			
	H= 08 05 57.2		USCGS	
12.	P	Z	08 58 29	
12.	eP	Z	09 29 12	
12.	iP	Z	10 41 32.0	
	i	NE	32.2	
	ScP	Z	46 58	
	S	NE	47 45	
	eL	E	50 56	
	eL	N	51 00	
	ScS	E	15	
	P: D			
	Mag. $5\frac{1}{2}$-$5\frac{3}{4}$ (Mat.)			
	6.2 S., 130.3 E.			
	Banda Sea.			
	h: 125 km ca.			
	H= 10 33 43.5		USCGS	
12.	P	Z	11 44 56	
	i	Z	45 00	
	eS?	E	46 38	
	27.8 N., 142.8 E.			
	Bonin Is. region.			
	h: 33 km ca.			
	H= 11 42 38		USCGS	
12.	eP	Z	11 55 48	
	34.3 N., 47.4 E.			
	Western Iran.			
	h: 33 km ca.			
	H= 11 44 26.1		USCGS	
12.	P	NEZ	12 07 49	

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Date	Phase	Comp.	Time(GMT) h m s	
	i	E	12 08 42	
	i	N	44	
12.	iP	Z	17 23 11.0	
	P: D			
	26.2 S., 178.4 E.			
	South of Fiji Is.			
	h: 560 km ca.			
	H= 17 12 37.3		USCGS	
12.	ePKP	Z	19 55 04	
	i	Z	10	
	i	Z	26	
	e	Z	56 34	
	21.9 S., 65.9 W.			
	Southern Bolivia.			
	h: 283 km ca.			
	H= 19 35 41.6		USCGS	
12.	P	Z	20 25 02	
12.	P	Z	20 55 04	
	S	E	28	
	i	N	29	
12.	P	EZ	21 07 58	
	e	E	08 26	
	S	NE	44	
12.	e	Z	21 27 13	
	e	Z	23	
	i	E	30	
12.	P	Z	21 37 20	
12.	P	NEZ	23 18 53	
	e	E	21 56	
13.	P	Z	00 23 57	
	i	N	24 48	
	19.6 N., 65.4 W.			
	Puerto Rico region.			
	h: 30 km ca.			
	H= 00 08 16.6		USCGS	
13.	P	Z	01 02 30	
	i	E	30.8	
	S	NZ	03 00	
13.	iP	Z	01 36 53.3	
	P: D			
13.	PKP	Z	01 56 43	
	25.9 S., 70.7 W.			
	Near coast of northern Chile.			
	h: 25 km ca.			
	H= 01 36 33		USCGS	
13.	PKP1	Z	02 42 10	

(cont.)

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Date	Phase	Comp.	Time(GMT) h m s	Date	Phase	Comp.	Time(GMT) h m s
	i	Z	02 42 19		eS?	N	15 19 11
	PKP2	Z	35		i	Z	12
	i	Z	52				
	pPKP2	Z	44 37	13.	P	Z	16 31 08
	19.3 S., 63.8 W.				S	NEZ	25
	Southern Bolivia.						
	h: 589 km ca.			13.	P	NEZ	16 40 38
	H= 02 23 23		USCGS		i	N	48
					i	Z	49
13.	iP Z, P N		03 00 59.2		e	N	43 20
	i E		59.5		46.1 N., 151.2 E.		
	P: C				Kurile Is.		
	53.9 N., 159.8 E.				h: 68 km ca.		
	Near east coast of Kamchatka.				H= 16 37 25.2		USCGS
	h: 100 km ca.						
	H= 02 56 03		USCGS	13.	P	Z	18 39 55
13.	ePKP	Z	04 32 00	13.	iP	NZ	19 24 17.8
	4.8 N., 76.3 W.				i	E	18.2
	Colombia.				S	NE	25 06
	h: 283 km ca.				P: N, C		
	H= 04 13 08.6		USCGS		Mag. 5.2 (Mat.)		
					33.0 N., 138.4 E.		
13.	P	Z	05 03 27		Near south coast of Honshu, Japan.		
	S	NEZ	38		h: 300 km ca.		JMA
13.	iP	EZ	06 58 57.6				
	i	N	58.0	13.	eP	N	19 39 25
	S	Z	59 27		e	Z	33
	P: E, D				e	N	39
	36.6 N., 141.3 E.						
	Near east coast of Honshu, Japan.			13.	P	Z	20 10 53
	h: 60 km ca.		JMA	13.	P	Z	20 28 59
					S	NEZ	29 13
13.	P	Z	07 11 03				
	i	Z	05.5	13.	eP	Z	20 59 34
	eS	N	45				
				13.	eP	Z	21 02 26
13.	iP	Z	08 58 23.0		23.3 S., 175.4 W.		
					Tonga Is. region.		
13.	iP	Z	10 47 21.8		h: 60 km ca.		
	eS	N	51		H= 20 50 55.9		USCGS
	P: D						
				13.	iP	EZ	21 56 21.3
13.	P	Z	10 59 56		S	N	39
	29.8 N., 80.5 E.				i	E	40
	Nepal-India border region.				P: W, C		
	h: 33 km ca.						
	H= 10 51 15.5		USCGS	13.	ePKP1	Z	23 06 25
					PKP2	Z	59
13.	iP	Z	12 07 33.3		36.0 S., 18.1 W.		
	P: D				South Atlantic Ridge.		
					h: 33 km ca.		
13.	P	NZ	12 46 37		H= 22 46 33.0		USCGS
	S	EZ	48 00				
	i	N	12	13.	eP?	Z	23 17 27
					i	N	18 09
13.	eP	Z	15 18 46				

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Date	Phase	Comp.	Time(GMT) h m s
14.	eP	Z	01 12 44
	eS	N	13 43
	e	E	50
14.	eP	Z	02 00 23
	27.6 S., 177.1 W.		
	Kermadec Is.		
	h: 77 km ca.		
	H= 01 48 42.4		USCGS
14.	P	Z	02 36 58
	19.0 S., 169.5 E.		
	New Hebrides Is.		
	h: 259 km ca.		
	H= 02 27 00.2		USCGS
14.	iP Z, P N		02 47 48.7
	S	Z	48 07
	i	NE	09
14.	eP	Z	03 36 00
14.	P	Z	06 46 11
	S	EZ	24
14.	iP	NEZ	08 05 49.5
	eS	N	06 39
	P: N, W, C		
14.	eP	Z	09 52 26
	50.4 N., 178.0 E.		
	Rat Is., Aleutian Is.		
	h: 46 km ca.		
	H= 09 46 08.6		USCGS
14.	iP	EZ	12 26 40.3
	iS	NE	58.5
	P: N, W, C		
14.	P	Z	12 43 36
	iS N, S E		39.7
14.	iP	NEZ	13 48 33.3
	P: W, D		
14.	P	Z	14 10 34
	i	Z	57
14.	P	Z	14 55 42
14.	eP	Z	15 05 14
	e	Z	32
14.	P	Z	15 10 03
14.	P	Z	16 28 34
	i	N	57
14.	P	EZ	16 56 36

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Date	Phase	Comp.	Time(GMT) h m s
	e	E	17 01 51
	eL	N	03 54
	eL	E	04 28
	50.3 N., 177.7 E.		
	Rat Is., Aleutian Is.		
	h: 33 km ca.		
	H= 16 50 15.6		USCGS
14.	P	Z	17 33 24
	e	Z	39
	43.7 N., 151.9 E.		
	Kurile Is. region.		
	h: 33 km ca.		
	H= 17 30 24.4		USCGS
14.	iP NZ, P E		17 37 57.2
	S	Z	38 31
	P: S, C		
14.	P	Z	17 59 58
14.	P	Z	18 20 54
14.	P	Z	18 39 41
	i	NEZ	42
14.	P	Z	20 51 20
	eS	E	43
14.	eP	Z	21 30 48
14.	eP	Z	23 10 07
	15.1 N., 146.0 E.		
	Mariana Is.		
	h: 33 km ca.		
	H= 23 05 05		USCGS
14.	P	NEZ	23 38 41
	20.7 S., 177.7 W.		
	Fiji Is. region.		
	h: 467 km ca.		
	H= 23 28 13.7		USCGS
14.	e	N	23 58 55
15.	iP	Z	03 10 40.2
	iS	E	55.4
	P: D		
15.	iP	Z	03 20 44.4
	P: C		
15.	iP	NEZ	03 59 23.5
	P: S, W, D		
	34.2 N., 135.8 E.		
	Near south coast of southern Honshu, Japan.		
	h: 344 km ca.		
	H= 03 58 24		USCGS

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Date	Phase	Comp.	Time(GMT) h m s
15.	P	Z	07 17 33
	S	EZ	42
15.	P	Z	09 10 15
	i	E	39
15.	iP	Z	11 11 03.0
	S	E	22
	P: D		
15.	eP	Z	11 28 55
15.	iP Z, P N		11 46 23.7
	S	E	38
	i	Z	39
	P: D		
15.	P	Z	12 29 00
	i	N	19.6
	42.3 N., 141.8 E.		
	Hokkaido, Japan.		
	h: 78 km ca.		
	H= 12 27 26		USCGS
15.	P	Z	12 34 50
	i	Z	51.6
	i	NE	54
	19.5 N., 146.0 E.		
	Mariana Is.		
	h: 159 km ca.		
	H= 12 30 45		USCGS
15.	eP	Z	12 37 48
	i	E	38 09
	i	NZ	10
	e	E	38.4
15.	P	Z	13 00 00
	e	Z	30
	S?	E	43
	e	E	01 26
	e	N	33
15.	iP	NZ	13 15 28.2
	S	E	48
	P: N, D		
15.	iP Z, P N		13 53 26.4
	i	E	28.5
	S	Z	54 04
	P: S, D		
15.	P	Z	14 58 09
	i	NEZ	10
15.	eP	Z	16 51 53
	eL	E	17 19 57
	eL	E	24 07
	48.0 S., 165.6 E.		

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Date	Phase	Comp.	Time(GMT) h m s
	Off west coast of south Island, New Zealand.		
	h: 15 km ca.		
	H= 16 39 02		USCGS
15.	P	Z	18 29 24
15.	P	Z	20 17 03
15.	P	Z	21 07 22
	52.3 N., 173.2 E.		
	Near Is., Aleutian Is.		
	h: 10 km ca.		
	H= 21 01 17.7		USCGS
15.	iP	NEZ	21 09 22.5
	S	NE	28
	P: N, E, C		
15.	P	Z	22 07 01
	i	N	11
	i	Z	12
15.	P?	EZ	22 13 04
	i	N	27
15.	P	Z	23 31 27
	i	N	50
15.	P Z, e P N		23 43 50
	16.1 S., 174.7 W.		
	Tonga Is.		
	h: 253 km ca.		
	H= 23 33 12.4		USCGS
16.	iP	NZ	00 06 10.7
	e	E	12
	e	Z	08 10
	eS	N	12 22
	eL	E	15 16
	eL	N	18
	eL	Z	47
	P: N, C		
	Mag. 6 (Mat.)		
	4.1 S., 135.1 E.		
	West New Guinea region.		
	h: 33 km ca.		
	H= 23 58 34.4		USCGS
16.	iP EZ, P N		03 07 12.6
	P: E, D		
16.	P	Z	05 14 30
16.	iP	Z	05 41 16.3
	i	NEZ	20.0
	eS	E	42 15

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Date	Phase	Comp.	Time(GMT) h m s
	i	N	05 42 20
	P: C		
	38.7 N., 141.2 E.		
	Northern Honshu, Japan.		
	h: 30 km ca.		JMA
16.	iP	Z	06 05 25.8
	P: C		
16.	iP	Z	06 06 24.5
	P: D		
	12.7 S., 166.4 E.		
	Santa Cruz Is.		
	h: 172 km ca.		
	H= 05 56 06		USCGS
16.	eL	E	06 07 37
16.	P	Z	07 04 55
	e	E	05 43
16.	eP?	E	11 36 35
16.	iP	Z	11 37 45.7
	eS?	N	40 17
16.	iP	NZ	11 42 21.2
	S	NE	47 36
	e	N	50
	e	E	58
	ScP	Z	48 43
	L	E	50 05
	Lr	Z	51 36
	L	N	52 04
	L	E	05
	eScS	E	45
	Mag. 6 (Mat.)		
	5.3 N., 125.7 E.		
	Mindanao, P. I.		
	h: 36 km ca.		
	H= 11 35 46.0		USCGS
16.	eP?	Z	11 52 58
16.	iP	Z	12 10 33.7
	e	E	52
	P: D		
16.	P	Z	12 13 35
16.	iP	Z	14 54 21.6
	i	Z	34
	e	EZ	55 22
	P: D		
16.	P?	E	15 04 39
	i	EZ	53
	e	NEZ	05 40
16.	eP	Z	15 26 59

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Date	Phase	Comp.	Time(GMT) h m s
	7.6 S., 128.2 E.		
	Banda Sea.		
	h: 152 km ca.		
	H= 15 19 02		USCGS
16.	eP	Z	16 45 11
	i	NEZ	20
16.	eP	Z	18 42 58
16.	eP?	N	19 00 44
17.	P	Z	03 05 06
	4.8 N., 125.8 E.		
	Talaud Is.		
	h: 103 km ca.		
	H= 02 58 35		USCGS
17.	e	E	06 02 23
17.	eP	Z	07 07 02
	i	Z	12
	45.5 N., 151.2 E.		
	Kurile Is.		
	h: 33 km ca.		
	H= 07 03 54		USCGS
17.	P E, eP N		13 27 40
	i	Z	49
	eL	N	31 38
	46.8 N., 153.7 E.		
	Kurile Is.		
	h: 35 km ca.		
	H= 13 24 03.7		USCGS
17.	eP	Z	15 14 44
17.	iP Z, P NE		15 36 09.0
	i	Z	42
	P: S, D		
17.	P	Z	15 43 41
	i	N	44 09
17.	iP	NZ	17 15 26.8
	P: S, D		
17.	iP	NEZ	17 24 04.1
	S	N	27 55
	i	Z	28 03
	P: N, E, C		
	Mag. 6.9 (Mat.)		
	22.5 N., 121.3 E.		
	Taiwan region.		
	h: 21 km ca.		
	H= 17 19 25.9		USCGS
17.	eP	Z	17 27 02

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Date	Phase	Comp.	Time(GMT) h m s
17.	P?	Z	17 31 46
17.	eP	Z	17 36 02
17.	eP	Z	17 58 16
17.	P	Z	18 07 44
17.	iP	Z	18 17 02.6
	i	N	04
	P: D		
	21.1 S., 175.2 W.		
	Tonga Is.		
	h: 75 km ca.		
	H= 18 05 45.4		USCGS
17.	P	Z	19 00 48
17.	eP	Z	19 44 16
17.	P	Z	20 16 02
	54.7 N., 175.8 E.		
	Bering Sea.		
	h: 18 km ca.		
	H= 20 10 10		USCGS
17.	iP	Z	20 27 06.6
	i	N	07.0
	P: D		
	55.1 N., 165.8 E.		
	Komandorsky Is. region.		
	h: 68 km ca.		
	H= 20 21 35		USCGS
17.	iP	Z	20 39 25.5
	i	NE	26.1
	S	N	41
	i	E	42
	P: C		
17.	eP	Z	21 27 51
	i	Z	28 05
	e	N	31.0
	e	E	31.3
	45.7 N., 151.0 E.		
	Kurile Is.		
	h: 33 km ca.		
	H= 21 24 42.7		USCGS
17.	P	Z	22 05 34
	S	N	06 12
	i	E	15
17.	iP Z, P N		23 29 55.2
	S	NE	30 21
	P: S, C		
18.	iP	Z	00 04 37.6
	P: D		

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Date	Phase	Comp.	Time(GMT) h m s
	1.5 N., 127.3 E.		
	Halmahera.		
	h: 157 km ca.		
	H= 23 57 48.2		USCGS
18.	iP	Z	01 20 18.4
	i	NE	18.7
	i	E	43
	e	N	21 11
	P: C		
18.	P	Z	03 21 29
	i	N	51
18.	iP	Z	08 07 16.7
	i	E	25.6
	i	Z	09 26
	i	N	27
	P: D		
	25.2 N., 142.8 E.		
	Volcano Is. region.		
	h: 10 km ca.		
	H= 08 04 23.3		USCGS
18.	iP	NZ	08 21 43
	i	Z	22 07
	P: N, C		
18.	P	Z	08 23 54
	0.1 N., 123.8 E.		
	Northern Celebes.		
	h: 178 km ca.		
	H= 08 14 36.2		USCGS
18.	eP	Z	09 02 00
	18.0 S., 168.5 E.		
	New Hebrides Is.		
	h: 143 km ca.		
	H= 08 52 01.5		USCGS
18.	P	Z	10 51 44
	i	Z	52 17
	44.4 N., 149.0 E.		
	Kurile Is.		
	h: 15 km ca.		
	H= 10 48 58.6		USCGS
18.	eP	Z	12 11 34
	i	N	46
	i	Z	12 13
	S	N	14 26
	e	E	42
	29.3 N., 128.3 E.		
	East China Sea.		
	h: 34 km ca.		
	H= 12 08 51.4		USCGS
18.	P	Z	12 55 01
	i	Z	03.8
	e	N	56 32

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Date	Phase	Comp.	Time(GMT) h m s	
18.	iP	Z	14 50 27.5	
	iS	Z, S E	43.3	
	P: D			
18.	iP	Z	15 44 27.7	
	S	NEZ	43	
	P: C			
18.	ePKP	Z	15 46 49	
	32.6 S., 70.4 W.			
	Chile-Argentina border region.			
	h: 117 km ca.			
	H= 15 26 37.2			USCGS
18.	iP	Z	16 48 03.6	
	P: C			
	20.0 S., 177.3 W.			
	Fiji Is. region.			
	h: 516 km ca.			
	H= 16 37 41.7			USCGS
18.	iPKP1	Z	16 56 18.9	
	i	N	21	
	i	Z	31	
	PKP2	Z	40	
	22.6 S., 70.1 W.			
	Near coast of northern Chile.			
	h: 35 km ca.			
	H= 16 36 25.9			USCGS
18.	P	Z	16 59 01	
18.	eP	Z	19 13 43	
18.	iP	NEZ	22 48 49.5	
	eS	E	50 30	
	P: S, W, C			
	Mag. 5 (Mat.)			
	43.6 N., 146.3 E.			
	Kurile Is.			
	h: 60 km ca.			JMA
19.	iP	NEZ	00 49 12.0	
	S	NE	25	
	P: N, E, D			
19.	eP	Z	02 24 44	
19.	iP	NEZ	02 32 45.0	
	S	E	59	
	P: S, E, D			
	36.0 N., 139.7 E.			
	Honshu, Japan.			
	h: 70 km ca.			JMA
19.	iP	Z	03 09 44.1	
	i	N	44.7	
	i	E	45.0	

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Date	Phase	Comp.	Time(GMT) h m s	
	e	E	03 13 28	
	e	E	17 07	
	eL	E	22 47	
	eL	N	26 24	
	P: D			
	Mag. 5¼-5½ (Mat.)			
	9.2 S., 159.0 E.			
	Solomon Is.			
	h: 50 km ca.			
	H= 03 00 59.0			USCGS
19.	P	EZ	03 11 22	
19.	P	Z	03 17 14	
	52.4 N., 173.4 E.			
	Near Is., Aleutian Is.			
	h: 49 km ca.			
	H= 03 11 12.5			USCGS
19.	P	Z	03 58 51	
	i	Z	59 50	
	e	E	51	
	1.7 S., 126.4 E.			
	Molucca Sea.			
	h: 43 km ca.			
	H= 03 51 25			USCGS
19.	P	Z	04 30 20	
	i	N	55	
	i	E	58	
19.	P	Z	04 32 52	
	22.5 S., 176.3 W.			
	South of Fiji Is.			
	h: 33 km ca.			
	H= 04 21 26.7			USCGS
19.	P	Z	04 58 13	
19.	P Z, eP	E	06 13 07	
	e	E	21 06	
	e	E	25 07	
	eL	E	30 26	
	eL	N	36	
	6.5 S., 105.4 E.			
	Sunda Strait.			
	h: 74 km ca.			
	H= 06 03 58.9			USCGS
19.	iP	Z	07 25 31.8	
	S	E	48	
	i	N	49	
19.	P	Z	11 08 11	
	12.3 S., 167.1 E.			
	Santa Cruz Is.			
	h: 233 km ca.			
	H= 10 59 04.1			USCGS

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Date	Phase	Comp.	Time(GMT) h m s	
19.	P	Z	12 03 43	
	i	E	51	
19.	P	Z	14 07 50	
	i	Z	09 41	
	eS	E	13 40	
	e	N	17 19	
	e	E	27	
	eL	E	19 13	
	eL	N	20 22	
	Mag. 5¼-5½ (Mat.)			
	4.8 S., 152.3 E.			
	New Britain region.			
	h: 70 km ca.			
	H= 13 59 55.2		USCGS	
19.	P	Z	14 13 29	
19.	P	Z	14 42 52	
	i	EZ	43 36	
19.	eP?	Z	15 04 16	
19.	P	Z	17 15 52	
	51.5 N., 176.1 E.			
	Rat Is., Aleutian Is.			
	h: 33 km ca.			
	H= 17 09 33.7		USCGS	
19.	eP	Z	17 58 25	
	6.8 S., 154.7 E.			
	Solomon Is.			
	h: 73 km ca.			
	H= 17 50 04		USCGS	
19.	eP	Z	17 59 15	
	i	NEZ	28	
	e	N	18 02 48	
	e	E	56	
	45.1 N., 151.5 E.			
	Kurile Is.			
	h: 33 km ca.			
	H= 17 56 04.0		USCGS	
19.	P	Z	19 52 21	
19.	P	Z	22 13 24	
	e	E	18 27	
	eL	N	20 36	
	eL	E	42	
	51.6 N., 175.2 E.			
	Rat Is., Aleutian Is.			
	h: 35 km ca.			
	H= 22 07 14.1		USCGS	
19.	iP	Z	22 15 32.1	
	iS	NE	50.2	
	P: D			
19.	eP	Z	22 21 05	

(cont.)

Date	Phase	Comp.	Time(GMT) h m s	
	i	EZ	22 21 16.1	
	45.4 N., 151.7 E.			
	Kurile Is.			
	h: 12 km ca.			
	H= 22 17 51.2		USCGS	
19.	i	Z	23 29 13	
19.	iP	Z	23 42 32.7	
	i	NE	33.2	
	P: D			
	20.8 S., 178.5 W.			
	Fiji Is. region.			
	h: 552 km ca.			
	H= 23 32 14.0		USCGS	
20.	P Z, eP N		00 50 02	
	i	Z	04.2	
	i	NEZ	05	
	i	Z	53 52	
	i	N	56	
	S	E	58 15	
	S	N	27	
	i	Z	42	
	L	N	01 06 09	
	L	E	07 25	
	Mag. 7¼ (Mat.)			
	14.7 S., 167.4 E.			
	New Hebrides Is.			
	h: 16 km ca.			
	H= 00 40 10.9		USCGS	
20.	P Z, eP E		01 14 42	
20.	P	Z	01 17 50	
20.	P	Z	01 20 15	
20.	iP	NE	01 47 51.2	
	i	Z	52	
	i	E	48 04	
	i	N	05	
	P: N, N			
20.	P	Z	02 15 58	
	i	EZ	16 11	
	40.8 S., 175.9 E.			
	North I., New Zealand.			
	h: 49 km ca.			
	H= 02 03 33.5		USCGS	
20.	P	Z	02 19 37	
	51.2 N., 173.7 E.			
	Near Is., Aleutian Is.			
	h: 41 km ca.			
	H= 02 13 38.9		USCGS	
20.	iP	Z	03 07 35.3	
	P: C			
20.	P?	Z	04 18 35	

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Date	Phase	Comp.	Time(GMT) h m s	
20.	eP	Z	05 39 35	
	i	Z	40	
	14.5 S., 167.3 E.			
	New Hebrides Is.			
	h: 21 km ca.			
	H= 05 29 43.3			USCGS
20.	P	NZ	07 22 46	
	i	E	23 17	
20.	eP	Z	12 55 08	
	4.3 N., 125.3 E.			
	Talaud Is.			
	h: 33 km ca.			
	H= 12 48 29			USCGS
20.	iP	Z	13 44 49.3	
	e	E	54 08	
	P: C			
	3.3 S., 135.7 E.			
	West New Guinea region.			
	h: 49 km ca.			
	H= 13 37 21.8			USCGS
20.	eP	Z	14 16 03	
	e	E	26 56	
	eL	N	28 10	
	eL	E	58	
	Mag. $5\frac{1}{2}$-$5\frac{3}{4}$ (Mat.)			
	1.8 N., 99.1 E.			
	Northern Sumatra.			
	h: 73 km ca.			
	H= 14 06 55.6			USCGS
20.	P	Z	14 44 25	
	2.3 N., 99.5 E.			
	Northern Sumatra.			
	h: 75 km ca.			
	H= 14 35 53			USCGS
20.	eP	Z	15 04 20	
20.	P	Z	20 50 08	
	45.1 S., 167.6 E.			
	South I., New Zealand.			
	h: 105 km ca.			
	H= 20 37 41.4			USCGS
20.	eP	Z	21 30 25	
	i	Z	38	
20.	eP?	Z	22 27 30	
	i	Z	45	
21.	iP	Z	00 24 09.5	
	S	NE	28.6	
	P: C			
21.	eP	Z	04 12 11	
	S	NE	38	

Date	Phase	Comp.	Time(GMT) h m s	
21.	iP	Z	04 15 12.3	
	i	NE	12.5	
	S	NE	16 15	
	P: C			
	32.5 N., 142.6 E.			
	South of Honshu, Japan.			
	h: 33 km ca.			
	H= 04 13 51			USCGS
21.	eP	Z	04 38 13	
	e	N	31	
21.	e	NZ	05 17 57	
	e	NE	18 18	
21.	iP	NZ	07 15 32.2	
	i	E	32.9	
	P: N, D			
21.	P	Z	11 29 05	
	50.6 N., 160.0 E.			
	Kurile Is. region.			
	h: 76 km ca.			
	H= 11 24 25			USCGS
21.	iP	Z	13 47 50.7	
	eS	NEZ	48 12	
	P: D			
21.	eP	Z	17 28 32	
	i	NZ	34	
	S	E	29 03	
21.	eP	Z	17 30 06	
22.	iP	NZ	03 12 50.0	
	i	E	50.5	
	e	NE	13 08	
	eS	N	18 28	
	L	N	21 14	
	P: N, C			
	1.3 N., 126.3 E.			
	Molucca Passage.			
	h: 25 km ca.			
	H= 03 05 43.6			USCGS
22.	P	Z	07 50 54	
	S	E	51 10	
22.	S	NE	07 52 09	
22.	iP	Z	10 30 42.0	
	51.8 N., 178.3 W.			
	Andreanof Is., Aleutian Is.			
	h: 89 km ca.			
	H= 10 24 25.5			USCGS
22.	iP	Z	10 41 56.9	
	i	Z	59.0	

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Date	Phase	Comp.	Time(GMT) h m s	
	epP	Z	10 43 55	
	S	N	50 27	
	esS	N	54 02	
	esSS	N	58.4	
	P: D			
	21.1 S., 178.7 W.			
	Fiji Is. region.			
	h: 578 km ca.			
	H= 10 31 39.5			USCGS
22.	eP	Z	11 09 40ca.	
22.	eP	NZ	13 28 52	
	e	NZ	59	
	eL	N	45 16	
	14.5 S., 167.1 E.			
	New Hebrides Is.			
	h: 27 km ca.			
	H= 13 19 04.5			USCGS
22.	P	Z	14 20 37	
	i	Z	48	
	S	N	28 35	
	eSS	N	32 23	
	eLq	N	34 56	
	L?	N	41 24	
	Mag. 5½ (Mat.)			
	14.7 S., 167.4 E.			
	New Hebrides Is.			
	h: 17 km ca.			
	H= 14 10 45.0			USCGS
22.	P	Z	15 44 50	
	14.1 S., 13.9 W.			
	South Atlantic Ridge.			
	h: 33 km ca.			
	H= 15 25 11			USCGS
22.	ePKP	Z	16 29 07	
	i	EZ	11.0	
	e	Z	31 04	
	eL	N	17 15 08	
	14.1 S., 13.8 W.			
	South Atlantic Ridge.			
	h: 33 km ca.			
	H= 16 09 29.5			USCGS
22.	iP	NZ	17 37 58.5	
	i	E	58.9	
	eS	E	38 25	
	i	Z	28	
	P: S, D			
22.	iP	NZ	18 20 01.5	
	i	N	08.3	
	S	EZ	30	
	i	N	31	
	P: N, C			

Date	Phase	Comp.	Time(GMT) h m s	
22.	iP	NEZ	18 53 35.4	
	i	NEZ	37.3	
	i	E	54 04	
	S	N	31	
	i	E	41	
	P: E, D			
	39.7 N., 142.1 E.			
	Near east coast of Honshu, Japan.			
	h: 40 km ca.			JMA
22.	P	NEZ	19 01 52	
22.	eP	Z	20 03 28	
	e	N	18 22	
	14.7 S., 167.5 E.			
	New Hebrides Is.			
	h: 24 km ca.			
	H= 19 53 23.8			USCGS
23.	iP	NEZ	03 59 29.7	
	i	EZ	50	
	S	E	04 01 29	
	L	N	02 00	
	P: S, W, C			
	39.9 N., 143.5 E.			
	Off east coast of Honshu, Japan.			
	h: 33 km ca.			
	H= 03 58 11			USCGS
23.	P	NZ	07 06 25	
	i	NZ	26.0	
	iS	NE	08 06.7	
	eL	E	41	
	28.6 N., 142.8 E.			
	Bonin Is. region.			
	h: 33 km ca.			
	H= 07 04 16.8			USCGS
23.	PKP	Z	08 06 11.5	
	i	NEZ	13	
	P: C			
	14.1 S., 13.9 W.			
	South Atlantic Ridge.			
	h: 33 km ca.			
	H= 07 46 33.7			USCGS
23.	iP	Z	09 53 05.0	
	iS	E	56 45.3	
	P: C			
	17.5 N., 145.8 E.			
	Mariana Is.			
	h: 129 km ca.			
	H= 09 48 38.2			USCGS
23.	iP	Z	10 51 00	
	i	NEZ	23	
	e	NEZ	34	

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Date	Phase	Comp.	Time(GMT) h m s
23.	iP	Z	13 21 44
	e	EZ	22 12
	P: C		
23.	iP	EZ	14 46 26.1
	i	N	26.5
	S	EZ	47 00
	P: E, D		
	36.4 N., 140.8 E.		
	Near east coast of Honshu, Japan.		
	h: 40 km ca.		JMA
23.	iP	E	15 13 43.5
	i	Z	43.8
	eS	E	14 09
	i	N	10.6
	P: E		
23.	eL	N	16 20 10
	24.0 N., 102.5 E.		
	Yunnan Province, China.		
	h: 33 km ca.		
	H= 16 05 32.7		USCGS
23.	iP NZ, P	E	20 03 06.0
	e	E	05 04
	P: N, C		
23.	P	NEZ	23 52 24
	i	Z	24.5
	ePcP	Z	55 22
	S	E	57 20
	ScP	Z	59 02
	eL	N	17
	Mag. 5¾ (Mat.)		
	52.2 N., 175.0 E.		
	Near Is., Aleutian Is.		
	h: 22 km ca.		
	H= 23 46 12.0		USCGS
24.	iP	NZ	05 11 12.1
	i	E	12.5
	i	N	17.2
	P: N, C		
	9.5 S., 113.0 E.		
	South of Java.		
	h: 67 km ca.		
	H= 05 02 11.8		USCGS
24.	iP	NZ	10 21 32.0
	i	E	33.1
	eS?	NEZ	22 00
	e	NE	40
	P: N, C		
24.	P	Z	11 58 34
24.	P	NZ	11 59 29
	i	E	11 59 30.6
	i	N	12 00 07
24.	iP EZ, P	N	13 49 14.5
	i	Z	29
	S	N	49
	P: E, D		
	37.4 N., 141.7 E.		
	Near east coast of Honshu, Japan.		
	h: 40 km ca.		JMA
24.	eP	Z	15 13 17
	14.7 S., 167.4 E.		
	New Hebrides Is.		
	h: 23 km ca.		
	H= 15 03 15.4		USCGS
24.	e	E	16 30 40
24.	P	NZ	16 47 33
	i	Z	49 44
	0.1 S., 124.3 E.		
	Molucca Sea.		
	h: 72 km ca.		
	H= 16 40 14		USCGS
24.	iP	NZ	17 04 49.0
	i	E	05 17
	S	N	27
	P: S, D		
24.	iP	NEZ	20 32 13.4
	iS	NE	15.2
	P: W		
24.	P	NEZ	23 26 44
	i	N	45.0
	S	NE	31 18
	Lq	E	32 26
	Lr	NZ	33 55
	ScS	NE	37 39
	Mag. 6¼-6½ (Mat.)		
	13.0 N., 124.5 E.		
	Samar , P. I.		
	h: 33 km ca.		
	H= 23 21 10.6		USCGS
24.	P	Z	23 30 12
25.	P	NEZ	01 33 45
	S	E	36 20
	L	E	39.6
	22.0 N., 144.2 E.		
	Volcano Is. region.		
	h: 98 km ca.		
	H= 01 30 11.9		USCGS

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Date	Phase	Comp.	Time(GMT) h m s
25.	iP	Z, P NE	03 30 05.2
	i	Z	19.0
	S	N	24.5
	P: C		
25.	P	Z	06 35 26
	i	Z	37
	eS	NE	36 50
25.	iP	Z, P NE	08 48 36.0
	eS	NE	46
	P: C		
25.	iP	EZ	13 14 15.6
	i	N	16.5
	i	Z	27
	iPcP	Z	17 16
	e	N	19 28.5
	S	NE	31
	ScP	Z	20 47
	Lq	NE	21 20
	Lr	Z	23 32
	ScS	E	24 48
	P: W, C		
	Mag. $5\frac{3}{4}$-6 (Mat.)		
	51.3 N., 178.7 E.		
	Rat Is., Aleutian Is.		
	h: 40 km ca.		
	H= 13 07 49.7		USCGS
25.	iP	NZ	16 36 09.8
	i	Z	21.5
	e	N	58
	P: S, C		
25.	iPKP	NZ	16 42 32.0
	P: D		
	19.3 S., 69.6 W.		
	Northern Chile.		
	h: 109 km ca.		
	H= 16 22 52.0		USCGS
25.	iP	NEZ	16 44 52.4
	S	E	45 13
	i	N	17.3
	P: N, W, C		
25.	eP	Z	18 44 52
	i	EZ	45 08
	S	NE	53 42
	eLq	NE	19 00 30
	eLr	E	03 50
	Mag. $5\frac{3}{4}$-6 (Mat.)		
	17.0 S., 175.9 E.		
	Fiji Is. region.		
	h: 16 km ca.		
	H= 18 34 28.4		USCGS
25.	eP	Z	20 23 51

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Date	Phase	Comp.	Time(GMT) h m s
	17.2 S., 175.9 E.		
	Fiji Is. region.		
	h: 33 km ca.		
	H= 20 13 19		USCGS
25.	P	Z	20 50 04
26.	P	NZ	01 00 24
	e	E	05 47
	47.5 N., 154.5 E.		
	Kurile Is.		
	h: 13 km ca.		
	H= 00 56 34.6		USCGS
26.	eP	NZ	03 14 56
26.	iP	Z, P N	04 42 08.5
	i	E	08.7
	e	E	27
	P: S, D		
26.	P	NZ	05 22 18.2
26.	e	E	07 05 36
	e	N	21.7
	35.7 S., 180.0		
	Off east coast of North I., New Zealand.		
	h: 63 km ca.		
	H= 06 42 53.9		USCGS
26.	iP	NZ	14 38 40.1
26.	P	Z	16 05 41
	e	EZ	07 50
	45.5 N., 145.9 E.		
	Hokkaido, Japan.		
	h: 172 km ca.		
	H= 16 03 12		USCGS
26.	iP	Z, P N	19 22 02.5
	P: C		
	52.0 N., 175.0 E.		
	Rat Is., Aleutian Is.		
	h: 37 km ca.		
	H= 19 15 52.6		USCGS
26.	iP	Z, P N	19 41 27.7
	P: D		
26.	PKP	Z	20 03 53
	i	NZ	04 29.0
	iPP	Z	08 05
	56.1 S., 27.6 W.		
	South Sandwich Is. region.		
	h: 120 km ca.		
	H= 19 44 10.9		USCGS
26.	iP	Z	21 25 15.6

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Date	Phase	Comp.	Time(GMT) h m s	Date	Phase	Comp.	Time(GMT) h m s
	i	NE	21 25 15.8	27.	P	Z	21 34 38.5
	e	NE	40		S	NEZ	35 01
	P: D				P: C		
26.	iP	Z	22 01 02.5	28.	P	Z	01 03 08
	i	NE	02.7		18.1 S., 177.9 W.		
	S	NE	14		Fiji Is. region.		
	P: C				h: 571 km ca.		
26.	iP	EZ	22 09 35.3		H= 00 53 01.4		USCGS
	i	N	35.5	28.	P	Z	02 17 31
	S	NE	56		S	NEZ	47
	P: E, D			28.	iP EZ, P N		03 01 10.1
26.	iP	Z	23 30 43.5		S	N	27
	P: C				i	E	33
	28.5 S., 178.1 W.				P: W, C		
	Kermadec Is.			28.	iP	Z	05 21 26.0
	h: 169 km ca.				S	N	25 33
	H= 23 19 11.2		USCGS		L	E	28.5
26.	P	NEZ	23 35 11		P: C		
	e	N	37 41		21.0 N., 120.9 E.		
	e	E	38 24		Philippine Is. region.		
	45.4 N., 151.3 E.				h: 38 km ca.		
	Kurile Is.				H= 05 16 36.3		USCGS
	h: 33 km ca.			28.	P	Z	06 46 19
	H= 23 32 03.9		USCGS		50.8 N., 156. 3 E.		
27.	iP	EZ	03 36 30.0		Kurile Is.		
	P: D				h: 33 km ca.		
	48.5 N., 154.9 E.				H= 06 41 48		USCGS
	Kurile Is.			28.	iP	EZ	07 51 18.0
	h: 41 km ca.				S	N	52 13
	H= 03 32 32.9		USCGS		P: W, D		
27.	iP	Z	06 44 29.2		34.3 N., 135.1 E.		
	S	NE	49		Honshu, Japan.		
	P: C				h: 20 km ca.		JMA
27.	eP	Z	10 48 02ca.	28.	P	Z	08 06 09.7
					i	Z	22.3
27.	iP	EZ	15 47 02.5		47.5 N., 152.9 E.		
	i	N	02.8		Kurile Is.		
	S	N	28		h: 33 km ca.		
	P: E, C				H= 07 03 19		USCGS
27.	eP	Z	15 54.54	28.	eP	Z	13 10 02
					e	NE	45
27.	iP	EZ	19 37 55.4	28.	e	Z	18 23 45
	P: E, C				e	E	26 22
	53.7 N., 156.7 W.				51.6 N., 174.5 E.		
	South of Alaska.				Near Is., Aleutian Is.		
	h: 33 km ca.				h: 67 km ca.		
	H= 19 29 25		USCGS		H= 18 14 10.1		USCGS
27.	iP	EZ	20 45 15.1	29.	e	E	02 12.6
	i	N	15.2				
	i	NEZ	55.4				
	P: E, C						

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Date	Phase	Comp.	Time(GMT) h m s
29.	iP	Z	05 48 42.0
	S	NEZ	48.3
	P: C		
29.	P	Z	07 00 16
	eS	N	02 09
	e	Z	26
	e	N	03 46
	29.7 N., 129.8 E.		
	Ryukyu Is.		
	h: 60 km ca.		
	H= 06 57 57		USCGS
29.	iP	Z	08 19 30.0
	i	Z	40
	i	Z	53
	S	Z	20 05
	P: C		
	34.4 N., 135.7 E.		
	Honshu, Japan.		
	h: 40 km ca.		JMA
29.	iP	Z	11 25 17.3
	P: D		
29.	iP	NEZ	15 06 00.5
	iS	N	19
	i	Z	39.5
	P: N, W, C		
29.	iP	Z	15 09 30.0
	i	E	55.0
29.	eP	Z	15 51 33
	eSS	E	16 11 35
	eLq	E	21 50
	eLr	NE	29.0
	Mag. 6-6¼ (Mat.)		
	57.8 S., 147.3 W.		
	South Pacific Cordillera.		
	h: 33 km ca.		
	H= 15 36 31.9		USCGS
29.	eP	Z	18 31 26
29.	iP	Z	19 21 57.0
	ePcP	Z	24 06
	eS?	N	28 20
	eL	E	31 00
	L	N	33 31
	P: C		
	1.7 S., 126.7 E.		
	Molucca Sea.		
	h: 17 km ca.		
	H= 19 14 25.6		USCGS
30.	eL	E	01 26 33
	51.6 N., 174.7 E.		
	Near Is., Aleutian Is.		

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Date	Phase	Comp.	Time(GMT) h m s
	h: 38 km ca.		
	H= 01 14 18.6		USCGS
30.	e	E	01 56 00
30.	P	Z	02 11 51.5
30.	P	Z	03 59 33
	0.5 S., 133.2 E.		
	West New Guinea region.		
	h: 33 km ca.		
	H= 03 52 24.7		USCGS
30.	e	E	04 08 19
30.	eP	Z	09 17 47
	i	Z	59
	eS?	N	21 57
	eL	N	23 04
	19.0 N., 121. 1 E.		
	Philippine Is. region.		
	h: 49 km ca.		
	H= 09 12 46.0		USCGS
30.	P	Z	10 46 59
	eS?	E	50 34
	L	E	51 15
30.	iP	Z	11 47 40.8
	e	Z	48 59
	P: D		
	36.5 N., 70.1 E.		
	Hindu Kush region.		
	h: 220 km ca.		
	H= 11 38 41.4		USCGS
31.	e	E	00 47 32
31.	iP	EZ	01 15 03.4
	eS	N	33
	P: W, C		
31.	iP	Z	01 22 21.9
	i	NE	22.0
	P: D		
31.	P	Z	02 13 27
	eS	E	20 34
	eSS	E	24 10
	L	E	29 00
	32.6 N., 78.2 E.		
	Kashmir-Tibet border region.		
	h: 33 km ca.		
	H= 02 04 42.9		USCGS
31.	iP	Z	03 32 47.5
	P: D		
	23.2 N., 177.0 W.		
	South of Fiji Is.		
	h: 94 km ca.		
	H= 03 21 27		USCGS

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Date	Phase	Comp.	Time(GMT) h m s	Date	Phase	Comp.	Time(GMT) h m s
31.	eP	Z	05 18 36				
	44.1 N., 128.8 W.						
	Off coast of Oregon.						
	h: 33 km ca.						
	H= 05 07 43.4		USCGS				
31.	e	NZ	06 27 43				
31.	P	Z	07 35 22				
	e	N	50				
31.	iP	NEZ	08 38 35.0				
	S	NE	55				
	P: S, E, D						
	Mag. 5.6 (Mat.)						
	35.8 N., 140.0 E.						
	Honshu, Japan.						
	h: 100 km ca.		JMA				
31.	iP	NZ	11 25 15.0				
	S	N	26 23				
	S	E	25				
	L	NE	50				
	P: N, C						
	31.4 N., 141.9 E.						
	South of Honshu, Japan.						
	h: 40 km ca.						
	H= 11 23 45.9		USCGS				
31.	iP	Z	11 46 37.5				
	i	N	38.2				
	iPcP	Z	48 20.5				
	iScP	EZ	52 08.7				
	eS	NE	53 10				
	e	N	55 21				
	ScS	E	56 26				
	e	N	34				
	L	E	57 33				
	P: C						
	Mag. $5\frac{3}{4}$-6 (Mat.)						
	7.5 S., 128.7 E.						
	Banda Sea.						
	h: 37 km ca.						
	H= 11 38 28.0		USCGS				
31.	iP	NZ	11 55 48.3				
	S	NZ	56 21				
	P: N, C						
31.	e	E	14 11.0				

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Director

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Date	Phase	Comp.	Time(GMT) h m s
1.	eP	Z	00 08 11
	S	E	24
1.	P	Z	00 41 25.8
	P	N	26.5
	eL	E	01 33 00
	9.1 S., 150.3 E.		
	East New Guinea region.		
	h: 37 km ca.		
	H= 00 32 57.5		USCGS
1.	iP	Z	02 00 40.0
	P	E	40
	P: C		
	14.9 S., 167.1 E.		
	New Hebrides Is.		
	h: 197 km ca.		
	H= 01 51 07.0		USCGS
1.	P	Z	04 13 59
	i	NEZ	14 01.5
	iS	NE	24.8
1.	P	EZ	04 40 25
	i	N	29
	i	Z	46
	i	Z	52.7
	i	Z	56
	i	Z	41 19
	iPcP	Z	42 24.2
	PPP	E	28
	e	NE	50 08
	L	E	52 10
	L	N	53 41
	20.2 N., 94.9 E.		
	Burma.		
	h: 57 km ca.		
	H= 04 32 45.3		USCGS
1.	P	Z	04 46 05
	i	Z	21.4
	i	Z	45
1.	P	Z	06 34 42.0
	i	E	45
	i	N	51
	P: D		
1.	P	EZ	08 00 53.2
	i	N	58
	i	Z	58.6
	PcP	Z	02 27
	eS	N	07 41
	eSS	E	11 37
	L	N	15 49
	L	E	16 15
	P: C		
	28.5 N., 83.2 E.		
	Nepal.		
	h: 33 km ca.		
	H= 07 52 26.1		USCGS

Date	Phase	Comp.	Time(GMT) h m s
1.	P	EZ	12 10 07.5
	i	N	09
	i	Z	13.4
	i	E	15.5
	i	N	17
	PcP	EZ	29.5
	i	N	36.8
	18.0 S., 178.5 W.		
	Fiji Is. region.		
	h: 607 km ca.		
	H= 12 03 15.0		USCGS
1.	iP	Z	12 13 15.8
	P: D		
1.	e	N	13 20 09
	eL	E	24 36
	eL	N	26 35
	5.6 S., 152.0 E.		
	New Britain region.		
	h: 48 km ca.		
	H= 13 05 15		USCGS
1.	P	Z	15 05 21.4
	P	E	21.7
	P	N	22
	S?	NE	48.5
1.	P	Z	15 45 21
	P	E	23.5
	i	N	24.5
	eS	N	48 46
	eS	E	50
	18.7 N., 144.9 E.		
	Mariana Is.		
	h: 308 km ca.		
	H= 15 41 23		USCGS
1.	P	Z	16 40 16.5
	P	NE	17
	19.6 S., 174.0 W.		
	Tonga Is.		
	h: 56 km ca.		
	H= 16 29 00.5		USCGS
1.	eL	E	18 45 17
	eL	N	43
1.	iP	Z	21 28 26.4
	P	NE	26.5
	i	N	29 42
	P: D		
1.	iP EZ, P N		21 35 11.0
	iS	E	29.3
	S	N	30.8
	P: S, W		
2.	iP	EZ	02 05 53.1
	iS	EZ	06 04.5
	P: E, D		

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Date	Phase	Comp.	Time(GMT) h m s
2.	P	Z	03 29 12
	14.9 S., 172.8 W.		
	Samoa Is.		
	h: 33 km ca.		
	H= 03 18 04.4		USCGS
2.	iP	EZ	05 23 26.8
	PcP	Z	42
	pP	Z	25 12
	i	E	26
	S	N	32 05
	S	E	06
	sS	E	35 25
	sPS	N	49
	eL	NE	40 07
	P: W, C		
	23.5 S., 180.0		
	South of Fiji Is.		
	h: 539 km ca.		
	H= 05 12 59.1		USCGS
2.	iP	EZ	11 51 10.6
	P: E, D		
2.	P	EZ	12 22 30
	S?	N	23 09
	i	N	23
2.	Lr	E	14 49 32
	Lr	Z	50 22
	Lr	N	33
	4.6 S., 105.6 W.		
	Northern Easter I.		
	Cordillera.		
	h: 33 km ca.		
	H= 13 57 51		USCGS
2.	P	Z	14 55 50.8
	i	NE	52.0
	i	Z	54.8
	pP	Z	57 50
	S	E	15 04 00
	i	N	10
	i	EZ	12
	P: D		
	17.9 S., 179.5 W.		
	Fiji Is. region.		
	h: 637 km ca.		
	H= 14 45 55.8		USCGS
2.	iP	NZ	15 08 28.1
	P	E	28.8
	S	E	16 37
	i	E	53
	P: S, D		
	18.0 S., 179.4 W.		
	h: 621 km ca.		
	H= 14 58 31.9		USCGS
2.	iP	Z	17 15 47.6

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Date	Phase	Comp.	Time(GMT) h m s
	P: C		
	17.9 S., 179.3 W.		
	Fiji Is. region.		
	h: 636 km ca.		
	H= 17 05 51.2		USCGS
2.	P	Z	17 24 16.5ca.
	i	N	18.5ca.
	i	E	21
	i	Z	37
	i	N	40
	i	E	57
2.	P	EZ	19 26 01
	i	Z	09
	i	E	14
	i	E	42
2.	P Z, eP E		20 29 40
	eS	NE	33 40
	eL	E	35 19
	eL	N	38.0
	21.0 N., 120.8 E.		
	Taiwan region.		
	h: 33 km ca.		
	H= 20 24 50.0		USCGS
2.	P	Z	22 58 38
	P	E	38.5
	e	NE	09 02
2.	P	EZ	23 04 36
2.	P	Z	23 15 26.9
	P	E	27.0
2.	PKP1	Z	23 59 26
	PKP2	Z	33
	PP	NE	00 01 37
	SS	E	18 40
	SSS	N	23 27
	Lq	E	35 14
	Lr	N	42 34
	Mag. 5¾ (Mat.)		
	16.0 N., 46.8 W.		
	North Atlantic Ridge.		
	h: 33 km ca.		
	H= 23 40 24.4		USCGS
3.	iP	NEZ	03 36 10.9
	i	E	27
	iS NE, S Z		30.0
	P: N, W, D		
3.	iP NZ, P E		04 53 51.9
	i	Z	59.5
	eS	E	05 00 52
	L	E	04 25
	L	N	07 53
	P: N, C		

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Date	Phase	Comp.	Time(GMT) h m s	
	8.8 N., 157.1 E.			
	Solomon Is.			
	h: 50 km ca.			
	H= 04 45 13			USCGS
3.	iP	Z, P NE	07 49 49.5	
	i	Z	54	
	PP	E	50 43	
	eS	NE	54 51	
	iScP	Z	56 26.5	
	i	Z	44	
	L	N	57 20	
	Lr	Z	51	
	Lr	E	58 31	
	P: S, E, C			
	51.9 N., 175.8 E.			
	Rat Is., Aleutian Is.			
	h: 58 km ca.			
	H= 07 43 39.1			USCGS
3.	iP	Z, P N	08 05 10.5	
	P: S, C			
	50.1 N., 155.7 E.			
	Kurile Is.			
	h: 70 km ca.			
	H= 08 00 58			USCGS
3.	eL	N	12 05 00	
	L	E	06 00	
	18.5 N., 70.3 W.			
	Dominican Republic region.			
	h: 27 km ca.			
	H= 10 57 08.8			USCGS
3.	P	NZ	13 27 25	
	P	E	26	
	i	NZ	38	
	i	N	29 15	
	eL	NE	30 50	
	44.8 N., 150.8 E.			
	Kurile Is. region.			
	h: 19 km ca.			
	H= 13 24 23.8			USCGS
3.	iP	Z, P NE	15 30 22.2	
	P: S, E, D			
3.	eL	NE	17 18 00	
	38.3 N., 119.3 W.			
	California-Nevada border region			
	h: 15 km ca.			
	H= 16 31 02.2			USCGS
3.	eL	NE	19 17 00	
	39.7 N., 23.2 E.			
	Aegean Sea.			
	h: 33 km ca.			
	H= 18 31 50.5			USCGS

Date	Phase	Comp.	Time(GMT) h m s	
3.	P	EZ	20 32 45.6	
	P	N	46.0	
	S	E	34 20	
	i	N	34	
	i	E	47	
	L	E	35 40	
	P: E, D			
	44.1 N., 145.3 E.			
	Hokkaido, Japan region.			
	h: 42 km ca.			
	H= 20 30 26.9			USCGS
3.	P	EZ	23 28 36.0	
	P	N	36.6	
	iS	NE, S Z	58.4	
	P: W, D			
4.	iP	EZ	00 48 15.0	
	P	N	15.4	
	i	N	39	
	i	E	40	
4.	P	EZ	01 32 58	
4.	eP	NZ	01 33 12	
	P	E	13	
	i	NE	22	
	S	E	52	
	S	N	53	
	i	N	34 14	
	i	E	20	
4.	iPKP1	Z	08 25 30.5	
	PKP2	NE	42	
	PKP2	Z	42.5	
	PKP1 : C			
	44.2 S., 75.9 W.			
	Off coast southern Chile.			
	h: 33 km ca.			
	H= 08 05 36.7			USCGS
4.	iP	Z, P N	09 53 07.3	
	iP	E	07.5	
	S	N	46	
	S	E	47	
	P: D			
4.	eP	EZ	13 35 42	
	P	N	43	
	i	Z	45	
	i	E	45.5	
	i	N	50	
	S	N	39 20	
	i	E	25	
	i	N	35	
	L	E	41 21	
	L	N	40	
	18.0 N., 146.5 E.			
	Mariana Is.			

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Date	Phase	Comp.	Time(GMT) h m s
	h: 62 km ca.		
	H= 13 31 12.8		USCGS
4.	P	Z	15 08 43
	P	E	44
	i	N	49
	i	N	09 10
	eS	NE	13 50
	Lq	E	14 56
	Lr	NZ	16 22
	51.1 N., 178.5 E.		
	Rat Is., Aleutian Is.		
	h: 41 km ca.		
	H= 15 02 18.3		USCGS
4.	iP	NEZ	15 38 25
	i	N	36
	P: N, W		
	29.9 S., 178.8 W.		
	Kermadec Is. region.		
	h: 225 km ca.		
	H= 15 26 54.7		USCGS
4.	P	NEZ	17 42 24
	iS E, S N		50.7
	i	Z	53
4.	eP	Z	20 04 43
	S	NZ	05 13
	i	E	17.0
5.	iP	E	00 26 30.0
	iP	Z	30.5
	PcP	Z	27 20
	P: E		
	15.6 S., 167.7 E.		
	New Hebrides Is.		
	h: 125 km ca.		
	H= 00 16 44.6		USCGS
5.	iP	NZ	01 46 30.6
	P	E	31
	P: S, D		
5.	P	Z	03 56 30.5
	P	N	31
	i	E	33
	i	Z	57 09
	i	Z	28
	PcP	Z	58 40.5
	Lq	E	04 05 30
	Lr	N	07 33
	Lr	E	09 39
	1.6 S., 126.7 E.		
	Molucca Sea.		
	h: 33 km ca.		
	H= 03 49 03.1		USCGS
5.	eP	Z	05 08 45

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Date	Phase	Comp.	Time(GMT) h m s
	i	E	05 08 49
	i	N	50
	i	Z	57.0
5.	PP	Z	13 03 09
	e	E	32
	60.2 S., 18.4 W.		
	Southwestern Atlantic Ocean.		
	h: 33 km ca.		
	H= 12 39 17.4		USCGS
5.	P	E	13 07 09
	P	Z	10
	i	Z	18
	i	EZ	33
5.	PKP	Z	13 20 15.7
	e	N	37.0
	eL	E	14 21 35
	eL	N	25 20
	59.9 S., 18.5 W.		
	Southwestern Atlantic Ocean.		
	h: 33 km ca.		
	H= 13 00 22.9		USCGS
5.	iP	NEZ	14 50 32.2
	iS	Z	33.2
	P: N, E, C		
5.	iP	EZ	18 31 40.9
	iS	NZ	42.5
	P: W, D		
5.	P	Z	19 42 22.0
	P	N	22.2
	P	E	23.0
	iS	N	43 06.6
	iS	EZ	06.8
5.	P	E	20 39 34.5
	P	Z	34.9
	i	N	35.5
6.	iP	NZ	03 18 24.0
	iS	NE	24.9
	P: S, D		
6.	P	Z	03 22 45
	P	N	46
	P	E	47
	i	Z	57
	S?	Z	24 56
	47.2 N., 145.2 E.		
	Sea of Okhotsk.		
	h: 367 km ca.		
	H= 03 20 05		USCGS
6.	P	N	06 14 16.5
	P	Z	16.8

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Date	Phase	Comp.	Time(GMT) h m s	
	i	E	06 14 18	
	S	N	46	
	S	EZ	47	
6.	P	Z	07 38 29.5	
	i	NE	31	
	i	Z	58	
	i	E	39 01	
	i	N	05	
6.	P	NZ	08 28 10	
	P	E	12	
	S	E	40	
	i	NZ	42	
	i	NE	46	
6.	P	NZ	09 36 09	
	i	E	12	
	S	E	41	
	i	N	47	
6.	P	Z	11 25 48	
	P	NE	49	
	i	N	56.0	
	eS	N	29 41	
	L	E	30 48	
	eL	N	31 20	
	22.8 N., 121.7 E.			
	Taiwan region.			
	h: 44 km ca.			
	H= 11 21 18.1		USCGS	
6.	eP	Z	15 37 15	
	e	N	39 47	
6.	e	N	16 06 13	
6.	eP	NEZ	17 52 47	
	i	N	52	
	i	E	57	
	i	N	53 13	
	i	N	28	
6.	eP	NEZ	18 15 59	
	eS	E	18 14	
	eS	N	17	
	24.5 N., 140.7 E.			
	Volcano Is. region.			
	h: 137 km ca.			
	H= 18 13 09		USCGS	
6.	P	NEZ	23 15 33	
	eS?	N	16 54	
	e	E	17 04	
	41.8 N., 142.0 E.			
	Hokkaido, Japan region.			
	h: 44 km ca.			
	H= 23 14 07		USCGS	
7.	iP	Z	04 24 11.0	

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Date	Phase	Comp.	Time(GMT) h m s	
	P	N	04 24 11	
	iS Z, S N		24.9	
	i	E	27	
	P: D			
7.	P	Z	04 54 19	
	i	NEZ	27	
	i	Z	38	
	46.9 N., 152.7 E.			
	Kurile Is.			
	h: 74 km ca.			
	H= 04 50 50.7		USCGS	
7.	P	Z	06 28 47	
	e	Z	29 23	
	31.1 S., 179.2 W.			
	Kermadec Is.			
	h: 280 km ca.			
	H= 06 17 23		USCGS	
7.	iP	Z	10 28 08.3	
	P	E	10	
	PcP	Z	29 19	
	P: D			
	Mag. 6.0 (Mat.)			
	4.5 S., 103.2 E.			
	Southern Sumatra.			
	h: 33 km ca.			
	H= 10 18 57		USCGS	
7.	Pn	Z	13 58 35.7	
	Pn	NE	36	
	i	E	41.3	
	i	N	46	
	i	N	55	
	Sn	EZ	56.5	
	i	N	59.4	
	Sg	NE	59 15	
7.	iP	EZ	15 43 12.0	
	iP	N	12.3	
	iS	NE	23.5	
	P: E, D			
7.	eP	Z	15 48 22	
	i	N	27	
	i	Z	41	
	eL	E	53 48	
7.	P	Z	15 50 48	
7.	iP NZ, P E		16 26 01.2	
	S	NE	28 09	
	i	Z	12	
	P: N, C			
8.	iP	Z	06 15 15.3	
	iP E, P N		15.5	
	S	Z	45	
	i	E	47	

(cont.)

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Date	Phase	Comp.	Time(GMT) h m s
	i	E	06 16 14
	P: C		
	36.1 N., 141.3 E.		
	Near east coast of Honshu, Japan.		
	h: 55 km ca.		
	H= 06 14 36		USCGS
8.	P	Z	11 50 35
	i	NE	36.0
	S	NE	55
8.	P	NZ	12 21 38
	i	E	40
	i	Z	22 12
	1.5 S., 126.7 E.		
	Molucca Sea.		
	h: 46 km ca.		
	H= 12 14 12		USCGS
8.	P	Z	12 36 54
	P	E	55
	1.6 S., 126.9 E.		
	Molucca Sea.		
	h: 51 km ca.		
	H= 12 29 28		USCGS
8.	P	Z	12 53 52
	i	E	54
8.	P	Z	13 53 15
	e	E	14 05 40
	eL	E	18 00
	23.3 N., 108.5 W.		
	Gulf of California.		
	h: 33 km ca.		
	H= 13 39 58.2		USCGS
8.	eP	Z	15 12 57
	i	NE	13 01
	eS	E	50
	i	N	53
8.	P	Z	21 08 02.2
	i	Z	05
	i	NE	06
	iS	N	38.5
8.	P	NEZ	23 27 55
	i	N	28 05
	eS	N	30 47
	eL	E	31 33
	46.8 N., 152.5 E.		
	Kurile Is.		
	h: 24 km ca.		
	H= 23 24 26.3		USCGS
9.	iP	N	01 56 00.7
	P	Z	01

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Date	Phase	Comp.	Time(GMT) h m s
	iS	NE	01 56 12.0
	P: N		
9.	iP	NZ	02 36 37.9
	P	E	38.0
	iS N, S E		37 15.0
	i	EZ	20.0
	P: S, D		
9.	P	Z	03 31 25
	i	N	39
	i	E	40
	i	E	32 05
	i	N	08
9.	eP	Z	07 28 10
	i	N	12
	i	NE	13.3
	S	E	34
	i	N	36.5
	i	E	37.5
	i	Z	40
9.	iP	Z	13 32 55.0
	iP	E	55.1
	iP	N	55.3
	eS	E	37 46
	L	E	38 54
	L	N	39 22
	P: D		
	52.6 N., 173.2 E.		
	Near Is., Aleutian Is.		
	h: 25 km ca.		
	H= 13 26 52.2		USCGS
9.	P	Z	16 06 34
	eP	E	35
	31.8 S., 179.6 W.		
	Kermadec Is.		
	h: 200 km ca.		
	H= 15 54 56		USCGS
9.	iP	NEZ	17 09 34.8
	i	E	41
	P: S, E, D		
	19.0 S., 175.7 W.		
	Tonga Is.		
	h: 195 km ca.		
	H= 16 58 40.3		USCGS
9.	iP	Z	19 13 17.7
	i	Z	14 55
	eS	NE	20 06
	eL	N	23 32
	L1	E	24 46
	L2	E	28 51
	L2	N	56
	P: D		
	8.6 S., 127.3 E.		

(cont.)

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Date	Phase	Comp.	Time(GMT) h m s
	Timor.		
	h: 33 km ca.		
	H= 19 04 55.2		USCGS
9.	iP	Z	19 22 47.5
	iP	E	47.7
	P	N	48
	S	N	23 14
	iS	E	16.0
	i	N	34
	P: C		
9.	eP	Z	19 55 04
	iS	E	56 18.0
	S	N	18
10.	P	Z	01 33 35.2
	i	N	39
	i	E	42
	S	N	59
	i	E	34 04
10.	iP	NEZ	02 48 20.2
	iS	NE	31.5
	S	Z	32
	P: S, W, C		
10.	eP	EZ	04 46 41
	sP	Z	47 24
	18.3 S., 174.6 W.		
	Tonga Is.		
	h: 131 km ca.		
	H= 04 35 40.3		USCGS
10.	P	Z	05 53 17.5
10.	iP	EZ	05 58 08.7
	i	N	09.4
	pP	Z	33
	i	N	43
	i	E	44
	i	E	57
	P: E, C		
	35.9 N., 70.5 E.		
	Hindu Kush region.		
	h: 125 km ca.		
	H= 05 49 00.0		USCGS
10.	P	NE	09 35 58
	iP	Z	59
	S NE, eS	Z	36 19
	P: D		
10.	eP	NZ	12 38 07
	i	E	07.4
	S	NEZ?	33
10.	P	NZ	15 17 37.5
	iP	E	37.6
	S	N	18 02

Date	Phase	Comp.	Time(GMT) h m s
10.	iP	NZ	15 23 43.7
	P	E	44.1
	S	NE	29 23
	Lq	E	32 09
	Lq	N	11
	Lr	NE	34 19
	P: N, C		
	1.9 N., 126.6 E.		
	Molucca Passage.		
	h: 106 km ca.		
	H= 15 16 50.5		USCGS
10.	eP	NZ	18 34 12
	i	NE	34
	i	NZ	44
	i	E	47
10.	iP	NEZ	19 54 55.5
	i	N	55 41
	P: N, W, D		
10.	iP	NEZ	21 33 26.8
	iS	NZ	36.3
	i	E	38
	P: N, E		
10.	iP	EZ	22 56 55.6
	P	N	56
	S	E	59 40
	S	N	42
	P: E, C		
10.	P	Z	23 20 59
	51.3 N., 178.8 W.		
	Andreanof Is.		
	h: 36 km ca.		
	H= 23 14 25.7		USCGS
11.	e	N	00 46 02
	i	N	49 10
	e	E	28
	e	N	55 32
11.	iP Z, P E		02 43 37.8
	P	N	39
	i	Z	49.6
	e	N	45 05
	e	EZ	06
	S	E	48 36
	Lq	E	49 24
	Lq	N	42
	Lr	Z	02 50 09
	iLr	N	55
	P: C		
	51.8 N., 174.1 E.		
	Near Is., Aleutian Is.		
	h: 35 km ca.		
	H= 02 37 34.7		USCGS

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Date	Phase	Comp.	Time(GMT) h m s	
11.	iP1	Z	03 36 23.8	
	iP2	NEZ	24.7	
	i	NEZ	40	
	i	NE	38 04	
	eS	E	45	
	eLr	NE	40 48	
	i	Z	41 37	
	Lr	E	59	
	P1: C			
	P2: S, W, C			
	Mag. 6.2 (Mat.)			
	44.7 N., 148.7 E.			
	Kurile Is.			
	h: 47 km ca.			
	H= 03 33 44.9		USCGS	
11.	iP	Z	03 43 44	
	i	Z	44 00	
11.	P	Z	03 45 48	
11.	P	Z	03 47 13	
	P: C			
11.	iP	NZ	03 55 36.8	
	i	E	37.3	
	eS	E	57 45	
	P: N, D			
11.	P	NEZ	04 03 24	
	e	N	05 44	
	P: C			
11.	iP EZ, P N		04 10 03.3	
	P: E, D			
11.	iP	NEZ	04 17 32.0	
	eS	E	19 37	
	P: N, E, D			
	44.3 N., 149.0 E.			
	Kurile Is.			
	h: 48 km ca.			
	H= 04 14 51.4		USCGS	
11.	P	Z	04 47 38	
	iP	EN	38.3	
	i	Z	51	
	eS	Z	49 44	
	44.5 N., 149.2 E.			
	Kurile Is.			
	h: 42 km ca.			
	H= 04 44 53.1		USCGS	
11.	iP	Z	05 00 39.8	
	i	EZ	54	
	i	N	55	
	i	Z	02 21	
	S	N	36	
	P: C			

(cont.)

Date	Phase	Comp.	Time(GMT) h m s	
	44.2 N., 149.5 E.			
	Kurile Is.			
	h: 36 km ca.			
	H= 04 57 54		USCGS	
11.	P	Z	05 02 21	
	44.2 N., 149.5 E.			
	Kurile Is.			
	h: 43 km ca.			
	H= 04 59 36		USCGS	
11.	P	EZ	05 14 10	
	e	NZ	24	
	S	E	16 21	
11.	iP	Z	05 23 05.8	
	S	N	25 15	
	P: C			
11.	P	Z	05 29 46	
	44.7 N., 150.0 E.			
	Kurile Is.			
	h: 33 km ca.			
	H= 05 26 52.9		USCGS	
11.	iP Z, P E		05 47 43.7	
	i	Z	53.9	
	i	E	55.4	
	P: C			
	44.2 N., 149.4 E.			
	Kurile Is.			
	h: 55 km ca.			
	H= 05 45 00.1		USCGS	
11.	P	Z	05 59 52	
	i	Z	52.1	
	S	E	06 02 04	
	i	N	08	
	44.2 N., 149.3 E.			
	Kurile Is.			
	h: 46 km ca.			
	H= 05 57 09.2		USCGS	
11.	P	Z	06 07 05	
	i	N	07	
	S	N	09 18	
	44.1 N., 149.2 E.			
	Kurile Is.			
	h: 33 km ca.			
	H= 06 04 22.4		USCGS	
11.	iP	NEZ	07 13 43.9	
	i	Z	51.6	
	i	Z	59.8	
	i	E	14 16	
	S	E	15 46	
	L	N	16 24	
	P: S, N, C			
	44.4 N., 149.2 E.			

(cont.)

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Date	Phase	Comp.	Time(GMT) h m s
	Kurile Is.		
	h: 50 km ca.		
	H= 07 11 05.7		USCGS
11.	P	Z	07 30 25
	i	Z	42.6
	S	EZ	32 30
	Lq	E	36
	Lq	N	33 05
	44.1 N., 149.4 E.		
	Kurile Is.		
	h: 61 km ca.		
	H= 07 27 44.5		USCGS
11.	P	Z	08 43 38.1
	P	E	38.3
	i	NZ	38.9
	i	E	39.4
	iS	E	45 49.2
	Lq	E	54
	Lq	N	46 12
	Lr	Z	52
	P: C		
	44.3 N., 149.0 E.		
	Kurile Is.		
	h: 54 km ca.		
	H= 08 41 01.1		USCGS
11.	P	Z	08 59 27
	iP	NE	27.4
	i	NEZ	09 01 13
	eS	NE	34
	44.2 N., 149.0 E.		
	Kurile Is.		
	h: 29 km ca.		
	H= 08 56 46		USCGS
11.	P Z, eP	NE	09 10 40
	i	E	12 20
	eS	E	48
	44.0 N., 149.5 E.		
	Kurile Is.		
	h: 61 km ca.		
	H= 09 07 58.3		USCGS
11.	eP	Z	10 02 11
	i	NZ	11.8
	i	E	12.1
	eS	E	04 13
	e	N	25
	44.1 N., 148.9 E.		
	Kurile Is.		
	h: 46 km ca.		
	H= 09 59 32.7		USCGS
11.	iP	Z	10 07 55.4
	P	NE	56
	e	E	09 03
	e	N	10 09 06
	i	Z	08
	P: D		

Date	Phase	Comp.	Time(GMT) h m s
11.	iP	NE	10 19 21.9
	eS	E	21 26
	Lq	E	38
	Lq	N	54
	Lr	Z	22 30
	i	N	24 42
	P: N, E, D		
	44.4 N., 149.3 E.		
	Kurile Is.		
	h: 29 km ca.		
	H= 10 16 37.3		USCGS
11.	P	Z	10 22 31
	i	Z	45
	i	Z	27 15
11.	P	EZ	10 43 50
	i	NEZ	51.2
	S	N	45 56
	S	E	57
	44.1 N., 149.3 E.		
	Kurile Is.		
	h: 64 km ca.		
	H= 10 41 10.5		USCGS
11.	P	Z	11 44 13.0
	iP	E	13.5
	i	N	14.2
	iS	NE	47.0
	P: D		
11.	iP	NEZ	12 02 40.8
	i	E	46
	i	Z	56.7
	S	E	04 26
	Lq	E	45
	Lr	N	05 22
	Lr	Z	34
	P: N, E, D		
	44.2 N., 149.1 E.		
	Kurile Is.		
	h: 33 km ca.		
	H= 12 00 00.8		USCGS
11.	P	NEZ	12 40 00
	i	NZ	13
	eS	E	42 02
	i	N	18
	i	N	30
	44.4 N., 149.0 E.		
	Kurile Is.		
	h: 51 km ca.		
	H= 12 37 24		USCGS
11.	P	Z	12 44 15
11.	iP Z, P	NE	12 48 14.0
	i	NZ	26.5
	P: C		

(cont.)

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Date	Phase	Comp.	Time(GMT) h m s
	44.7 N., 149.0 E.		
	Kurile Is.		
	h: 33 km ca.		
	H= 12 45 37		USCGS
11.	P	Z	12 49 59
	i	NE	50 00.7
	i	Z	08
	eS	NE	52 17
	45.9 N., 149.5 E.		
	Kurile Is.		
	h: 140 km ca.		
	H= 12 47 03.6		USCGS
11.	P	NZ	12 57 12
	eS	E	59 29
	e	N	41
	i	N	53
	44.0 N., 150.1 E.		
	Kurile Is. region.		
	h: 56 km ca.		
	H= 12 54 26		USCGS
11.	P	NZ	13 46 46.0
	i	Z	47 03
	eS	N	48 59
	P: D		
11.	iP Z, P N		14 31 34.2
	i	N	47
	i	N	33 51
	L	N	34 16
	L	E	25
	P: C		
11.	P	Z	14 36 22
	i	NE	22.9
	i	Z	23.3
	i	Z	30
11.	iP EZ, P N		15 42 13.5
	S	NE	44 24
	i	E	43
	Lq	NE	50
	Lr	Z	46 25
	P: E, D		
	44.5 N., 149.2 E.		
	Kurile Is.		
	h: 55 km ca.		
	H= 15 39 36.3		USCGS
11.	P	EZ	15 50 20
	24.8 N., 95.5 E.		
	Burma.		
	h: 123 km ca.		
	H= 15 43 09.0		USCGS
11.	iP	Z	16 11 43.2
	iP	NE	43.4

(cont.)

Date	Phase	Comp.	Time(GMT) h m s
	i	N	16 13 11
	S	N	45
	P: D		
11.	P	Z	16 27 39
	51.7 N., 176.4 E.		
	Rat Is.		
	h: 59 km ca.		
	H= 16 21 19.5		USCGS
11.	iP Z, P NE		16 31 36.0
	eS	E	33 47
	eL	N	34 46
	eL	E	35 14
	P: S, W, C		
11.	iP	NEZ	16 37 16.0
	i	N	39 38
	eL	E	45
	P: N, E, D		
11.	P	Z	17 14 48
	iP	N	48.7
	i	E	49.3
	i	E	15 09.5
	i	N	11.0
	S	E	16 49
	L	N	17 22
	L	E	32
	L	Z	48
	44.2 N., 149.0 E.		
	Kurile Is.		
	h: 50 km ca.		
	H= 17 12 09.7		USCGS
11.	P	NEZ	18 04 19
	S	N	06 22
	e	E	07 40
	eL	E	09 00
11.	P	N	18 08 41
	P	EZ	42
	S	N	10 55
11.	P	NEZ	18 32 24
	S	N	34 27
	L	N	35 06
	L	E	10
	44.0 N., 149.3 E.		
	Kurile Is. region.		
	h: 33 km ca.		
	H= 18 29 43		USCGS
11.	eP?	Z	18 51 50
	eP?	NE	51
	i	Z	52 06
	eL	E	56 24
11.	P	Z	20 46 59

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Date	Phase	Comp.	Time(GMT) h m s	
	P	NE	20 46 59.5	
	i	E	47 12	
	i	N	14.5	
	S	N	49 07	
	e	E	16	
	Lq	N	32	
	Lr	E	50	
	eLr	Z	50 20	
	44.1 N., 148.9 E.			
	Kurile Is.			
	h: 45 km ca.			
	H= 20 44 20.3		USCGS	
11.	iP	Z	20 52 38.4	
	i	Z	51.0	
	i	EZ	53.0	
	i	Z	59	
	i	E	53 03	
11.	P	Z	20 54 41	
	i	N	56 57.5	
11.	P	EZ	22 55 10	
	i	N	10.5	
	i	Z	22.5	
	eL	N	58 11	
	eL	E	23	
	44.5 N., 149.5 E.			
	Kurile Is.			
	h: 33 km ca.			
	H= 22 52 29		USCGS	
11.	iP	NZ	23 12 52.2	
	i	E	52.9	
	i	N	57.0	
	i	N	13 04	
	i	E	05	
	i	E	35.5	
	i	Z	37.5	
	i	N	43	
	P: N, C			
12.	iP	NEZ	00 23 36.5	
	i	E	44	
	i	E	55	
	S	N	25 41	
	i	N	56	
	iL	N	26 14	
	L	E	19	
	P: N, E, D			
	44.2 N., 148.9 E.			
	Kurile Is.			
	h: 30 km ca.			
	H= 00 20 55.7		USCGS	
12.	iP	Z	01 08 34.1	
	iP	E	34.5	
	P: C			

Date	Phase	Comp.	Time(GMT) h m s	
12.	iP	Z	02 05 43.0	
	e	Z	06 01	
	i	Z	16	
	i	Z	08 07	
	i	N	22	
	eL	E	35	
	P: D			
	44.2 N., 149.0 E.			
	Kurile Is.			
	h: 30 km ca.			
	H= 02 03 02.8		USCGS	
12.	iP Z, P N		02 53 50.0	
	i	E	51	
	P: C			
	10.7 S., 166.2 E.			
	Santa Cruz Is.			
	h: 125 km ca.			
	H= 02 44 39.1		USCGS	
12.	P	Z	03 12 23	
	i	NEZ	24	
	e	E	14 22	
	eS	N	33	
	L	E	48	
	L	N	55	
	L	Z	15 39	
	43.9 N., 149.1 E.			
	Kurile Is. region.			
	h: 33 km ca.			
	H= 03 09 44.6		USCGS	
12.	eL	E	04 09 46	
12.	P	Z	05 11 52	
	i	Z	12 05	
	45.9 N., 152.0 E.			
	Kurile Is.			
	h: 287 km ca.			
	H= 05 09 16		USCGS	
12.	iP Z, P N		05 31 09.5	
	i	N	20	
	i	EZ	23	
	i	E	31.5	
	S	E	33 11	
	Lq	E	36	
	Lq	N	34 05	
	eLr	Z	27	
	P: C			
	Mag. 5½ (Mat.)			
	44.2 N., 149.8 E.			
	Kurile Is.			
	h: 41 km ca.			
	H= 05 28 40.3		USCGS	
12.	iP	NEZ	05 43 35.0	
	i	Z	42.0	

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Date	Phase	Comp.	Time(GMT) h m s	Remarks
	i	Z	05 43 46.5	
	eS	E	45 43	
	i	Z	51	
	Lq	E	46 00	
	Lq	N	05	
	Lr	Z	47 00	
	P: S, W, C			
	Mag. 5¾ (Mat.)			
	44.0 N., 149.1 E.			
	Kurile Is.			
	h: 64 km ca.			
	H= 05 41 00.3		USCGS	
12.	iP	NEZ	06 06 11.2	
	i	NE	25	
	S	N	08 12	
	eLq	NE	35	
	Lr	Z	09 00	
	Lr	N	09	
	Lr	E	14	
	P: N, E, D			
	Mag. 5¾ (Mat.)			
	44.3 N., 149.0 E.			
	Kurile Is.			
	h: 48 km ca.			
	H= 06 03 34.8		USCGS	
12.	iP NZ, P E		06 27 12.6	
	P: N, D			
12.	iP	Z	06 49 04.0	
	i	N	18	
	S	E	51 05	
	Lq	E	32	
	Lq	N	39	
	Lr	Z	52 04	
	P: N, E, D			
	44.2 N., 149.1 E.			
	Kurile Is.			
	h: 40 km ca.			
	H= 06 46 26.4		USCGS	
12.	iP	Z	06 59 37.0	
	i	Z	53.5	
	P: D			
	45.6 N., 149.5 E.			
	Kurile Is.			
	h: 45 km ca.			
	H= 06 57 05		USCGS	
12.	P	Z	07 02 58	
	20.9 S., 173.8 W.			
	Tonga Is.			
	h: 33 km ca.			
	H= 06 51 33.2		USCGS	
12.	eP	Z	07 53 51	
	e	Z	54 12	
	eL	N	56 27	
	eL	E	07 56 31	
	43.9 N., 149.0 E.			
	Kurile Is. region.			
	h: 62 km ca.			
	H= 07 51 15		USCGS	
12.	eP	Z	08 04 35	
	i	Z	47	
	eL	NE	07 21	
12.	iP	Z	09 23 07.0	
	i	Z	36.6	
	eL	N	26 08	
	eL	E	42	
	P: C			
12.	P	NEZ	09 39 02	
	S	N	39	
	i	E	39.8	
12.	P	Z	09 46 57	
	e	N	48 44	
	eL	E	49 49	
12.	eP	Z	10 07 22	
	i	Z	31	
	i	N	36	
	S	NE	45	
12.	P	Z	10 44 59.5	
	i	NZ	45 13.5	
	eL	NE	47 55	
	44.9 N., 149.4 E.			
	Kurile Is.			
	h: 33 km ca.			
	H= 10 42 24		USCGS	
12.	P	EZ	11 11 08	
	i	E	18	
	i	E	22.0	
	i	E	25	
	i	N	28	
	e	E	30	
	i	N	35	
12.	P	NZ	12 20 52	
	i	NEZ	21 06	
	e	E	24 10	
12.	P	Z	14 34 53	
	i	E	55	
	i	Z	35 04	
	i	NE	07.5	
	i	N	20	
	eS	E	37 01	
	i	N	04	
	eL	E	36	
	eL	N	55	

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Date	Phase	Comp.	Time(GMT) h m s	Date	Phase	Comp.	Time(GMT) h m s
12.	eP?	Z	15 14 56		Chile-Bolivia border region.		
	i	EZ	59.3		h: 103 km ca.		
	i	N	59.6		H= 18 50 11.3		USCGS
	i	N	15 08				
	i	Z	12	12.	iP	Z	19 15 17.0
	i	E	13		S	N	17 21
	i	E	22		i	NE	28
	i	N	25		eL	N	50
	e	E	16 07		eL	E	18 04
	e	N	18		P: D		
12.	P	NZ	15 22 10	12.	iP	Z	21 11 30.3
	iP	E	10.7		i	E	43
	eL	N	25 11		i	N	45.5
	eL	E	19		i	E	50
					i	Z	55
12.	P	Z	18 40 54		S	N	13 29
	i	E	41 09		eL	N	15 56
	e	N	43 23		eL	E	16 00
	eL	E	44 00		P: C		
					44.4 N., 148.2 E.		
12.	P	NEZ	18 45 15.7		Kurile Is.		
	i	N	28		h: 60 km ca.		
	i	E	30.2		H= 21 08 54		USCGS
	S	E	47 17.8				
	eL	N	48 00	12.	iP Z, P E		22 19 25.4
	P: N, E, D				i	N	26.0
	44.0 N., 149.1 E.				S	E	21 24
	Kurile Is.				i	Z	29
	h: 61 km ca.				Lq	E	38
	H= 18 42 39.1		USCGS		Lq	N	41
					Lr	Z	22 40
12.	P	Z	18 48 21.7		P: W, C		
	i	NE	22.5		44.2 N., 149.0 E.		
	S E, eS Z		50 20		Kurile Is.		
	eLq	E	51		h: 48 km ca.		
	eLq	N	53		H= 22 16 46.3		USCGS
	iLr	Z	51 47				
	P: D			13.	P	Z	01 24 20
	44.1 N., 149.0 E.				i	Z	39
	Kurile Is.						
	h: 41 km ca.			13.	eP	E	01 33 09
	H= 18 45 43.3		USCGS		iS	NEZ	35.8
12.	iP Z, P NE		18 57 17.9	13.	P	NEZ	02 23 31
	i	NE	28		i	N	32.0
	i	E	37		S	EZ	25 34
	i	N	37.5		L	E	40
	S	N	59 21		L	N	58
	P: C				L	Z	26 58
					44.1 N., 149.3 E.		
12.	PKP1	Z	19 09 49		Kurile Is.		
	i	Z	54.6		h: 50 km ca.		
	i	E	56.4		H= 02 20 52.0		USCGS
	PKP2	NE	10 07				
	Lq	N	50 53	13.	P	Z	04 31 03
	Lq	E	51 10		33.5 N., 69.5 E.		
	Lr	E	20 00 37		Afghanistan.		
	20.3 S., 68.9 W.				h: 57 km ca.		
			(cont.) -36-		H= 04 21 29		USCGS

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Date	Phase	Comp.	Time(GMT) h m s	
13.	P	Z	04 43 37	
	i	Z	45	
	i	E	46	
	i	E	44 02	
	i	NZ	04	
	i	E	45 06	
	i	N	12	
13.	iP	NZ	05 16 37.6	
	i	E	46.0	
	i	Z	46.2	
	i	N	47.3	
	e	E	22 00	
	P: S, C			
13.	iP	EZ	07 07 51.3	
	iP	N	51.6	
	i	Z	08 19	
	iS E, S N		09 06	
	S	Z	07	
	P: W, C			
	Mag. 6.0 (Mat.)			
	41.9 N., 143.4 E.			
	Hokkaido, Japan region.			
	h: 32 km ca.			
	H= 07 06 13.6		USCGS	
13.	iP Z, P NE		08 10 22.5	
	i	Z	37.5	
	P: C			
13.	iP	NEZ	11 01 24.7	
	i	E	41	
	i	Z	02 25	
	S	NE	42	
	P: N, E, D			
	44.0 N., 139.8 E.			
	Eastern Sea of Japan.			
	h: 33 km ca.			
	H= 10 59 33		USCGS	
13.	iP Z, P N		11 36 49.0	
	S	N	37 09	
	P: D			
13.	iP	NEZ	13 34 57.2	
	S	NEZ	35 16	
	i	N	21	
	P: N, E			
13.	iP	EZ	15 47 15.7	
	i	N	16.0	
	S	NE	38	
	S	Z	39	
	P: E, D			
13.	P	NEZ	16 37 18	
	i	N	19	
	i	Z	43	
	iS	NE	51.5	
	i	Z	53	

Date	Phase	Comp.	Time(GMT) h m s	
13.	P	Z	17 33 37	
	i	N	41.7	
	i	N	46	
	i	E	49	
	i	Z	58	
	21.0 N., 120.5 E.			
	Philippine Is. region.			
	h: 33 km ca.			
	H= 17 28 46		USCGS	
13.	iP Z, P NE		18 00 26.5	
	S	E	02 28	
	i	N	34	
	i	NE	43	
	P: S, W, C			
	44.0 N., 149.1 E.			
	Kurile Is.			
	h: 51 km ca.			
	H= 17 57 46.3		USCGS	
13.	iP	Z	20 14 03.5	
	i	N	04.6	
	eS	N	24 17	
	eSS	E	29 53	
	eSSS	N	33 02	
	eLq	E	35 03	
	eLr	E	41 06	
	P: D			
	37.8 N., 29.4 E.			
	Turkey.			
	h: 18 km ca.			
	H= 20 01 48.1		USCGS	
13.	iP	NEZ	20 52 11.3	
	i	E	12.2	
	i	Z	13.9	
	S	E	34	
	S	Z	35	
	i	N	36	
	P: S, E, D			
13.	P	Z	21 49 08	
	i	N	09	
	i	Z	12.8	
	iS	NE	30.4	
	iS	Z	30.6	
	i	N	31.2	
13.	P	EZ	22 56 07	
	e	N	39	
14.	eP	Z	01 24 00ca.	
	eL	E	34 36	
	6.0 S., 151.6 E.			
	New Britain region.			
	h: 27 km ca.			
	H= 01 15 49.2		USCGS	
14.	iP?	Z	04 26 47	
	i	N	50.5	

(cont.)

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Date	Phase	Comp.	Time(GMT) h m s
	i	E	04 26 50.7
	i	Z	56.0
14.	iPKP	EZ	07 29 21.3
	iPKP	N	21.5
	i	E	30 08.3
	i	Z	09.0
	i	N	10.2
	Lq	E	08 09 41
	Lr	E	19 07
	i	E	25 38
	P: W, D		
14.	iP	Z	10 00 19.1
	P	NE	19.3
	i	Z	30
	i	E	31
	i	NEZ	40
	i	Z	01 46
	eL	E	03 16
	i	N	07 23
	P: D		
	44.4 N., 149.4 E.		
	Kurile Is.		
	h: 33 km ca.		
	H= 09 57 34.0		USCGS
14.	P	Z	11 57 14
	i	Z	30
	i	E	33
	i	N	59 28
14.	iP NZ, P E		12 57 58.0
	S	NE	58 00
	P: S, E, C		
14.	iP NZ, P E		13 24 47.0
	eS	E	31 20
	Lr	N	38 09
	Lr	E	35
	P: S, D		
	32.0 N., 87.7 E.		
	Tibet.		
	h: 37 km ca.		
	H= 13 17 01.7		USCGS
14.	iP	NEZ	13 24 51.8
	i	E	52.6
	i	Z	53.5
	S	NE	25 15
	i	EZ	18
	i	Z	20
	P: S, W, D		
14.	iP	NEZ	14 28 46.4
	iS	NEZ	29 06
	P: N, W, C		
	35.7 N., 139.2 E.		
	Near south coast of Honshu, Japan.		

(cont.)

Date	Phase	Comp.	Time(GMT) h m s
	h: 153 km ca.		
	H= 14 28 19		USCGS
14.	P	NZ	15 42 23
	S	E	42
	iS	NZ	43
14.	P	Z	17 51 59
	i	EZ	52 01
15.	iP	Z	00 56 29.9
	i	E	57 17
	i	N	20
	e	E	59 48
	P: C		
15.	iP NZ, P E		01 03 41.8
	P: N, D		
	53.7 N., 160.4 E.		
	Near east coast of Kamchatka.		
	h: 33 km ca.		
	H= 00 58 37		USCGS
15.	iP	Z	01 23 15.0
	i	Z	21
	i	E	22.0
	i	Z	22.3
	i	N	23
	i	Z	27.7
	S	NZ	24 05
	i	Z	08.6
	P: E, C		
15.	P	Z	01 47 53
	i	EZ	53.8
	S	E	49 56
	L	N	50 34
	L	E	37
	L	Z	52 31
	44.1 N., 149.2 E.		
	Kurile Is.		
	h: 33 km ca.		
	H= 01 45 11.6		USCGS
15.	P	Z	03 36 02
	i	N	06
	S	EZ	23
	iS	N	23.8
15.	iP	Z	04 52 36.2
	i	NE	36.8
	i	Z	55 28
	S	E	57 49
	S	N	52
	Lq	N	59 42
	Lr	Z	05 00 03
	Lr	N	11
	50.1 N., 178.2 E.		
	Rat Is.		
	h: 28 km ca.		
	H= 04 46 13.1		USCGS

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Date	Phase	Comp.	Time(GMT) h m s
15.	iP	Z	08 06 21.0
	eL	N	16 33
	eL	E	17 28
	i	N	19 58
	eL	Z	22 17
	P: D		
	29.7 N., 95.3 E.		
	India-China border region.		
	h: 33 km ca.		
	H= 07 59 20.4		USCGS
15.	P	NEZ	08 45 17.7
	i	NEZ	43
	P: N, E, D		
15.	iP	Z	09 32 44.5
	i	NE	45.2
	e	E	43 31
	SS	E	48 13
	Lq	E	54 45
	Lr	N	10 00 32
	Lr	E	42
	P: C		
	Mag. 6.2 (CGS)		
	37.9 S., 177.5 E.		
	Off east coast of north Island,		
	New Zealand.		
	h: 58 km ca.		
	H= 09 20 29.8		USCGS
15.	iPZ , P N		11 16 05.0
	i	E	05.7
	S	E	27
	i	Z	29
	P: D		
15.	iP	Z	12 00 03.5
	S	NEZ	26
	P: N, D		
15.	iP Z, P N		12 54 51.8
	i	E	52.3
	S	E	57 15
	S	N	16
	eLq	N	32
	eLq	E	41
	eLr	Z	58 20
	P: N, D		
	44.1 N., 149.3 E.		
	Kurile Is.		
	h: 33 km ca.		
	H= 12 52 10.1		USCGS
15.	P	Z	12 58 03
	i	Z	07
15.	iP	Z	12 58 58.8
	i	N	59.5
	i	E	59 00

(cont.)

Date	Phase	Comp.	Time(GMT) h m s
	i	E	12 59 07
	S N, eS E		31
	P: D		
15.	P	Z	13 03 40.5
	27.2 S., 175.9 W.		
	Kermadec Is.		
	h: 53 km ca.		
	H= 12 51 52.6		USCGS
15.	P	NEZ	13 12 01
	S	N	14 12
	eL	NE	15 00
	43.9 N., 149.4 E.		
	Kurile Is. region.		
	h: 33 km ca.		
	H= 13 09 18.6		USCGS
15.	iP	Z	13 14 45.5
	S	NZ	15 06
	i	Z	08.1
	P: C		
15.	iP	NEZ	13 21 26.9
	S	N	23 36
	L	E	24 11
	L	N	19
	P: S, W, C		
	43.9 N., 149.5 E.		
	Kurile Is. region.		
	h: 33 km ca.		
	H= 13 18 44.0		USCGS
15.	iP Z, P NE		13 28 43.9
	P: E		
15.	P	NEZ	13 51 58.5
15.	P	NEZ	13 57 16
	S	N	50
15.	P	NEZ	14 21 45.5
	i	Z	45.7
	S	N	23 47
	L	E	24 00
	L	N	20
	Lr	Z	45
	P: S		
	44.2 N., 149.3 E.		
	Kurile Is.		
	h: 19 km ca.		
	H= 14 18 55.4		USCGS
15.	iP Z, P NE		15 21 09.4
	e	N	28 13
	e	E	34
	P: C		
	52.2 N., 174.8 E.		
	Near Is.		

(cont.)

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Date	Phase	Comp.	Time(GMT) h m s	
	h: 35 km ca.			
	H= 15 14 59.9		USCGS	
15.	eP	Z	15 51 41	
	i	Z	52 06.5	
	i	N	16	
15.	P	NEZ	16 09 51	
	eL	N	12 46	
	eL	E	50	
	44.0 N., 149.3 E.			
	Kurile Is.			
	h: 33 km ca.			
	H= 16 07 09.1		USCGS	
15.	P	Z	16 53 16	
	i	Z	36	
	i	Z	45	
	eS	E	17 03 10	
	eSS	E	08 02	
	eLq	NE	14 10	
	Lr	E	21 36	
	13.9 N., 51.7 E.			
	Eastern Gulf of Aden.			
	h: 33 km ca.			
	H= 16 41 12.5		USCGS	
15.	P	NEZ	17 59 09	
15.	P	EZ	19 09 16	
	eL	E	18 50	
	51.7 N., 174.2 W.			
	Andreanof Is.			
	h: 37 km ca.			
	H= 19 02 11.8		USCGS	
15.	iP EZ, P N		19 29 04.9	
	iS	E	17.5	
	iS	NZ	17.6	
	P: E, D			
15.	P	NZ	19 30 03	
	i	N	32	
15.	iP Z, P NE		20 55 23.1	
	e	E	32	
	S	N	45	
	i	E	47	
	P: C			
15.	eP?	Z	21 08 07	
	i	NZ	13	
	i	E	32.5	
	i	EZ	35	
	i	N	36	
15.	i	Z	21 28 32	
	e	Z	29 21	

Date	Phase	Comp.	Time(GMT) h m s	
15.	iP	Z	22 00 35.1	
	i	N	40	
	e	N	03 51	
	eL	E	04 53	
	P: C			
15.	P	Z	22 37 40	
	iS E, S Z		38 08.0	
	iS	N	08.5	
15.	P	Z	23 21 06	
15.	P	NZ	23 21 14	
	i	E	17	
	iS	N	30 04	
	iS	E	05	
	iLq	NE	37 26	
	Lr	Z	40 39	
	Lr	NE	41 15	
	i	Z	44 00	
	i	E	12	
	Mag. 6½-6¾ (Mat.)			
	20.9 S., 173.7 E.			
	New Hebrides Is. region.			
	h: 22 km ca.			
	H= 23 10 25.2		USCGS	
15.	P	Z	23 38 36	
	S	N	57	
16.	P	Z	02 22 41	
	i	E	43	
	i	N	56	
	S	E	23 24	
	iS	N	24.5	
	i	Z	26	
16.	e	N	03 33 56	
	eL	E	39 55	
	eL	N	41 00	
	eL	N	49 06	
	eL	E	50 11	
16.	ePPS	E	04 28 19	
	eSS	E	32 27	
	i	N	45	
	SSS	N	37 23	
	eLq	E	43 43	
	eLq	N	44 15	
	Lr	E	51 23	
	Lr	Z	51	
	Lr	N	52 24	
	Mag. 6-6½ (Mat.)			
	34.3 S., 112.2 W.			
	Easter I. Codillera.			
	h: 33 km ca.			
	H= 03 55 17.6		USCGS	

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Date	Phase	Comp.	Time(GMT) h m s
16.	P	Z	04 59 22
	i	Z	23.0
	i	E	26
	i	NZ	27
	i	Z	36.8
	i	E	05 00 13
	S	NE	52
	L	NE	01 16
	L	Z	48
	29.5 N., 141.9 E.		
	South of Honshu, Japan.		
	h: 37 km ca.		
	H= 04 57 30.0		USCGS
16.	iP	NEZ	06 05 08.0
	iS	Z	10.7
	P: N, W, D		
16.	P	NZ	06 19 28
	i	N	38
	i	Z	48
16.	P	EZ	07 43 10
	i	N	11
	S	N	45 15
	L	N	50
	L	E	51
	eL	Z	46 40
	44.0 N., 149.4 E.		
	Kurile Is. region.		
	h: 33 km ca.		
	H= 07 40 28.5		USCGS
16.	P	Z	08 04 08.5
16.	P	NEZ	08 48 47
	iS	NEZ	55.5
	i	N	49 08
16.	P	NEZ	09 26 01
	iS	NZ	14.0
	i	E	15
	i	NEZ	22
16.	P	NZ	11 53 43
	i	E	46.8
	i	Z	54 16.1
	iS N, S E		54 16.6
16.	iP	Z	13 59 54.9
	i	Z	14 00 12.8
	iS	N	13.7
	iS	E	14.0
	P: C		
16.	iP	EZ	16 10 37.6
	i	N	11 10
	i	Z	11
	P: W, C		

Date	Phase	Comp.	Time(GMT) h m s
16.	iP Z, P NE		18 35 38.0
	i	NZ	36 41
16.	P	Z	19 19 16
	i	Z	16.9
	i	E	17.0
	i	N	17.2
	iS	E	20 27.5
	i	N	29.5
	L	N	52
	L	E	21 00
16.	iP EZ, P N		20 56 30.6
	P: W, D		
16.	P	Z	20 57 14
	i	E	14.7
	i	Z	39
	S	NE	48
16.	eP	Z	21 18 42
	S	N	19 10
	i	E	10.9
	i	Z	11.3
17.	P	NZ	03 10 37
	i	E	39
	i	Z	12 00
	37.7 N., 29.6 E.		
	Turkey.		
	h: 9 km ca.		
	H= 02 58 19.9		USCGS
17.	P	Z	03 53 12
	i	E	13.5
	i	N	17
	50.0 N., 78.1 E.		
	Eastern Kazakh SSR.		
	h: 0 km ca.		
	H= 03 44 58.2		USCGS
17.	P	Z	03 54 54
17.	P Z, eP NE		10 47 43
	i	Z	49.2
	i	E	52.5
	eS	N	50 40
	Lq	N	51 01
	Lq	E	02
	i	E	33
	Lr	E	52 05
	Lr	N	09
	Lr	Z	53 31
	P: C		
	23.9 N., 123.3 E.		
	Southwestern Ryukyu Is.		
	h: 47 km ca.		
	H= 10 43 35.1		USCGS

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Date	Phase	Comp.	Time(GMT) h m s
17.	eP	Z	11 03 44
	i	Z	04 08
	eL	E	24 20
	eL	N	25 05
17.	iP	Z	12 41 05.9
	i	N	07.6
	i	Z	15.5
	i	E	17
	S	E	41
	iS	N	41.2
	P: C		
17.	P	Z	13 21 21
17.	iP NZ, P	E	14 16 17.7
	iS	E	44.7
	iS	N	45.3
	i	Z	46.5
	P: N, C		
17.	P	NZ	17 20 22
	i	N	54
	i	E	57
17.	P	Z	19 11 15
	S	E	16 17
	eL	N	17 57
	eL	E	18 07
	52.0 N., 175.0 E.		
	Near Is., Aleutian Is.		
	h: 67 km ca.		
	H= 19 05 09.1		USCGS
17.	iP	Z	20 06 27.5
	e	E	15 06
	P: C		
17.	iP EZ, P	N	20 22 37.0
	i	N	23 29
	i	Z	53
	PP	E	24 19
	S	E	28 43
	Lq	E	32 04
	Lq	Z	07
	Lq	N	12
	eLr	N	34 39
	eLr	E	35 00
	eLr	Z	35 56
	P: N, W, D		
	32.0 N., 87.8 E.		
	Tibet.		
	h: 8 km ca.		
	H= 20 14 48.6		USCGS
18.	P	Z	01 26 22
	i	Z	27
	S	E	32 42
	eLq	E	35 57

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Date	Phase	Comp.	Time(GMT) h m s
	eLr	N	01 39 11
	eLr	E	25
	32.0 N., 87.7 E.		
	Tibet.		
	h: 19 km ca.		
	H= 01 18 35.2		USCGS
18.	P	Z	03 27 12
18.	iP	Z	04 40 08.8
	i	EZ	09.3
	i	N	10.7
	S	NZ	24
	i	EZ	25
	P: D		
18.	P	EZ	07 49 23
	i	E	38
	iS	N	52.5
18.	iP	EZ	08 25 05.7
	PPP	Z	27 13
	eS	E	31 03
	eLq	N	34 00
	eLq	E	06
	Lr	N	37 45
	Lr	E	38 13
	P: E, C		
	25.0 N., 93.8 E.		
	Eastern India.		
	h: 46 km ca.		
	H= 08 17 37.6		USCGS
18.	iP	Z	11 19 22
	i	E	23
	i	Z	26
	P: D		
18.	P	Z	11 08 33
	P: C		
18.	iP	Z	16 08 07
	iP	N	08
	i	N	14
	S	NE	32
	i	N	44
	i	E	45
	i	NE	52
	P: C		
18.	P	NEZ	18 19 30
	45.4 N., 149.9 E.		
	Kurile Is.		
	h: 33 km ca.		
	H= 18 16 32		USCGS
18.	P	EZ	18 28 10
	i	E	53
	S	NEZ	29 28

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Date	Phase	Comp.	Time(GMT) h m s
	i	E	18 29 54
	i	N	30 06
	P: E		
18.	P	NZ	18 31 16
18.	iP	NZ	20 22 15
	i	Z	17
	S	NE	38
	P: S, D		
18.	iP	EZ	22 59 05
	i	N	06
	S	NE	44
	i	Z	47
	P: W, C		
	34.5 N., 141.2 E.		
	Off east coast of Honshu, Japan.		
	h: 51 km ca.		
	H= 22 58 15		USCGS
18.	iP	Z	23 04 31
	i	E	32
	iS	Z	05 00
	i	NE	03
	P: D		
18.	P	Z	23 23 26
	eL	E	52 34
	18.9 S., 175.5 W.		
	Tonga Is.		
	h: 106 km ca.		
	H= 23 12 20		USCGS
19.	iP NZ, P E		01 13 13
	i	Z	23
	i	NE	25
	S	N	33
	i	E	44
	P: S, D		
19.	P	Z	06 44 06
	i	Z	47 39
	S	NE	48 55
	L	E	49 36
	L	N	51
	P: C		
	Mag. $5\frac{3}{4}$-6 (Mat.)		
	52.3 N., 172.0 E.		
	Near Is., Aleutian Is.		
	h: 54 km ca.		
	H= 06 38 12.6		USCGS
19.	P	Z	07 49 33
	i	Z	34
19.	iP	EZ	08 03 07
	S	NE	23
	P: W, C		

Date	Phase	Comp.	Time(GMT) h m s
19.	P	EZ	08 22 34
	i	N	35
	S	N	56
19.	iP Z, P N		10 22 27
	i	E	28
	i	N	29
	iS N, S E		44
	P: D		
19.	iP	Z	12 55 21
	i	N	22
	i	NE	23
	S	NE	59 30
	Lq	N	13 01 12
	Lq	E	15
	eLr	Z	02 10
	P: C		
	53.8 N., 160.5 E.		
	Near east coast of Kamchatka.		
	h: 100 km ca.		
	H= 12 50 23.0		USCGS
19.	iP Z, P N		13 16 38
	i	N	40
	S	NEZ	17 01
	P: C		
19.	iP	NEZ	14 25 07
	S	NE	23ca.
	i	Z	25
	P: S, E, D		
19.	P	Z	14 54 36
	iS N, S EZ		55 00
19.	iP	NZ	15 31 28
	i	E	29
	S	NEZ	32 13
	e	Z	19
	i	Z	27
	P: S, D		
19.	P	Z	18 30 31
	i	NZ	42
	i	Z	57
	i	E	58
	eS	N	32 55
	L	N	33 29
	L	E	42
19.	P	Z	18 33 40
19.	eP	Z	21 13 45
	e	Z	52
	i	N	55
	S	Z	14 35
	S	N	36

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Date	Phase	Comp.	Time(GMT) h m s	
19.	iP NE, P Z		21 18 22	
	i	Z	19 06	
	S	N	20 27	
	eLr	E	21 41	
	P: E, D			
	44.6 N., 149.2 E.			
	Kurile Is.			
	h: 33 km ca.			
	H= 21 15 39			USCGS
20.	iP	NEZ	02 00 07	
	i	EZ	22	
	S	E	02 12	
	L	E	19	
	L	N	41	
	eL	Z	45	
	P: N, E			
	44.6 N., 149.2 E.			
	Kurile Is.			
	h: 40 km ca.			
	H= 01 57 24.8			USCGS
20.	P	Z	02 06 49	
20.	iP	NEZ	02 59 39.5	
	i	Z	44	
	iS	NEZ	46	
	P: N, E, C			
20.	S	NEZ	03 01 26	
20.	S	NEZ	03 01 56	
20.	P	Z	03 03 21	
	S	NEZ	27	
20.	iP	NEZ	03 13 39.0	
	i	N	43	
	S	NEZ	45	
	P: E, C			
20.	iS NZ, S E		03 17 45.0	
20.	iS	NEZ	03 18 55.0	
20.	S	Z	04 14 03	
20.	iP	EZ	04 31 30.2	
	iS	NEZ	36.4	
	P: E, C			
20.	P	Z	05 24 13	
	iP	NE	13.3	
	i	Z	17.0	
	S	NE	33	
20.	iP Z, P NE		05 47 35.5	
	S	NEZ	42	
	P: D			

Date	Phase	Comp.	Time(GMT) h m s	
20.	iP	NEZ	06 09 51.7	
	i	Z	10 47	
	e	E	17 16	
	e	E	20 39	
	eL	E	24 54	
	P: S, D			
	6.8 S., 129.3 E.			
	Banda Sea.			
	h: 149 km ca.			
	H= 06 01 57.7			USCGS
20.	iP Z, P NE		06 35 48.1	
	i	Z	55	
	iS	E	36 05.1	
	iS	N	05.3	
	iS	Z	05.5	
	P: D			
20.	P	Z	06 42 09.2	
	S	E	15.5	
	iS	Z	15.7	
20.	P	NZ	06 43 57	
20.	eL	E	08 05 48	
	10.4 N., 126.1 E.			
	Philippine Is. region.			
	h: 45 km ca.			
	H= 07 53 41.4			USCGS
20.	P	Z	09 29 55	
20.	iP	NZ	10 15 53.0	
	i	E	54	
	iS E, S N		16 08.7	
	i	Z	09.9	
	P: N, C			
20.	P	Z	10 19 46	
	i	N	46.9	
	i	N	21 07	
20.	iP	Z	10 45 57.7	
	iS	Z	46 03.9	
	iS	E	04.0	
	iS	N	04.1	
	P: E, C			
20.	iP	EZ	10 46 24.6	
	iS	Z	30.6	
	iS	NE	30.8	
	P: E, C			
20.	iP	Z	11 22 45.8	
	P	E	46.0	
	P: C			
20.	iP	Z	12 46 18.7	

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Date	Phase	Comp.	Time(GMT) h m s
	P: C		
	3.4 S., 139.3 E.		
	West New Guinea.		
	h: 59 km ca.		
	H= 12 38 49.7		USCGS
20.	iP Z, P NE		12 52 09.8
	iS N, S E		53 04.4
	eL	E	55 52
	P: D		
20.	iP	Z	15 34 33.6
	i	Z	38.0
	iS	NEZ	40.0
	P: N, E, C		
20.	iP Z, P NE		16 04 27.4
	iS	NE	33.7
	P: C		
20.	iP	Z	16 56 52.0
	iP	N	52.3
	P: C		
20.	P	Z	17 07 57
	i	Z	57.8
	S	N	08 27
	S	E	28
20.	P Z, eP N		18 15 43
	i	Z	48
	i	NE	49
	L	N	31 27
	eL	E	39
	42.8 N., 126.5 W.		
	Off coast of Oregon.		
	h: 33 km ca.		
	H= 18 04 35.7		USCGS
20.	P	Z	19 06 02
	iS	N	23.8
	iS Z, S E		24.0
20.	P	Z	19 49 46.5
	i	N	46.9
	i	NE	50
	eL	E	52 53
	P: C		
	44.6 N., 149.2 E.		
	Kurile Is.		
	h: 33 km ca.		
	H= 19 47 00.4		USCGS
20.	iP	NEZ	21 56 31.9
	i	Z	44.1
	P: S, W, C		
	52.2 N., 158.6 E.		
	Near east coast of Kamchatka.		
	h: 44 km ca.		
	H= 21 51 46.9		USCGS
20.	eP	Z	22 28 31
	i	E	39.7
	i	Z	40.8
	e	N	29 04
20.	iP	EZ	23 44 59.3
	iP	N	59.6
	iS NE, S Z		45 20
	P: E, D		
21.	e	Z	00 14 50
	e	Z	15 23
	i	EZ	38
21.	P	Z	00 32 12
	i	N	15
	S	NE	41 10
	L	NE	55 33
	L	Z	58 02
	Mag. 5¾-6 (Mat.)		
	28.1 N., 56.0 E.		
	Southern Iran.		
	h: 28 km ca.		
	H= 00 21 14.5		USCGS
21.	iP	NEZ	01 15 15.7
	i	Z	27.6
	S	N	40
	P: N, W, D		
21.	iP	EZ	03 43 28.0
	P: W, D		
21.	P	Z	05 28 58
	S	EZ	29 30
	S	N	31
21.	P	Z	07 07 19.3
	i	NZ	23
	i	E	24
	S	NE	42.5
	i	N	51.5
21.	P	E	15 17 37.5
	i	EZ	38.0
	i	N	50.6
	i	E	58.0
	i	N	18 06
	S	E	11
21.	iP EZ, P N		18 16 11.6
	iS	E	25.3
	i	N	26.0
	P: S, E, D		
21.	P	NEZ	20 20 21
22.	iP Z, P NE		01 01 42.0
	i	E	52

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Date	Phase	Comp.	Time(GMT) h m s
	i	N	01 01 59
	P: S, W, D		
	0.1 S., 124.4 E.		
	Molucca Sea.		
	h: 33 km ca.		
	H= 00 54 20.0		USCGS
22.	iP	Z, P NE	02 03 21.7
	S	NEZ	47
	P: C		
22.	iP	Z	04 16 16.5
	i	E	17 35
	i	N	48
	P: D		
22.	P	NEZ	04 27 06
	eS	E	32 48
	L	NE	35 37
	0.6 N., 125.4 E.		
	Molucca Passage.		
	h: 43 km ca.		
	H= 04 19 54.6		USCGS
22.	iP	EZ	05 57 58.0
	i	Z	58 36
	i	E	38
	i	E	47
	P: E, C		
	36.3 N., 77.7 E.		
	Kashmir-Sinkiang border region.		
	h: 28 km ca.		
	H= 05 49 18.9		USCGS
22.	eP	Z	06 42 30
22.	P Z, eP	NE	13 24 03
	S	NE	32 56
	L	E	40 14
	L	N	41 43
	Lr	Z	44 11
	Mag. $5\frac{1}{2}$-$5\frac{3}{4}$ (Mat.)		
	20.9 S., 173.2 E.		
	New Hebrides Is. region.		
	h: 80 km ca.		
	H= 13 13 23.1		USCGS
22.	iPKP Z, PKP	E	14 39 28.5
	sPKP	Z	40 03
	pPKP	Z	17
	PKP: D		
	18.3 S., 69.1 W.		
	Northern Chile.		
	h: 122 km ca.		
	H= 14 19 50		USCGS
22.	iP	EZ	15 39 42.5
	i	N	42.9

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Date	Phase	Comp.	Time(GMT) h m s
	S	N	15 40 01.0
	i	Z	06.4
	P: E, D		
22.	iP	Z	17 26 41.4
	i	NE	45.0
	S	E	27 21
	P: C		
22.	eP	Z	21 20 46
	i	Z	53
	i	N	58
	eS	NZ	26 36
	L	E	29 26
	2.3 S., 138.5 E.		
	West New Guinea.		
	h: 57 km ca.		
	H= 21 13 27		USCGS
22.	iP	EZ	21 55 12.7
	i	N	13.0
	i	NZ	42.0
	iS	N	52.0
	i	EZ	53.0
	P: E, D		
	36.9 N., 141.2 E.		
	Near Honshu, Japan.		
	h: 40 km ca.		JMA
22.	P	Z	22 10 27
	i	NE	28.5
	eS	E	59
22.	iP Z, P	E	22 17 43.3
	i	N	44.5
	i	E	47.5
	P: W, D		
22.	iP	EZ	23 08 53.6
	i	N	55
	i	Z	09 06.5
	S EZ, eS	N	16
	P: E, D		
22.	P	NZ	23 49 40
	i	E	40.5
	S	NZ	50 18
22.	iP	Z	23 54 29.8
	i	NE	31.0
	S	N	59 38
	L	N	00 01 10
	L	E	38
	iL	EZ	41
	P: C		
	Mag. 6-$6\frac{1}{4}$ (Mat.)		
	7.1 N., 123.5 E.		
	Mindanao, P. I.		
	h: 60 km ca.		
	H= 23 48 07.1		USCGS

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Date	Phase	Comp.	Time(GMT) h m s
22.	P	Z	23 57 18
23.	P	NE	00 39 58
	iP	Z	58.5
	i	E	40 20.7
	i	N	22.0
23.	iP	NEZ	02 33 22.2
	e	E	34 19
	S	N	24
	P: S, E, D		
23.	P	Z	05 19 25
	i	E	26.5
	i	N	27.0
	eS	NE	59
23.	P	EZ	08 54 10
	i	E	56 03
	51.0 N., 160.8 E.		
	Kurile Is. region.		
	h: 33 km ca.		
	H= 08 49 21		USCGS
23.	P	NZ	09 02 20.5
	i	E	22.2
	S	E	43.5
	i	N	46.5
	P: N, D		
23.	P	NZ	10 48 06
	i	E	07.5
	iS	E	28.5
23.	iP Z, P NE		11 11 15.0
	P: D		
	32.3 S., 179.2 W.		
	South of Kermadec Is.		
	h: 82 km ca.		
	H= 10 59 18.1		USCGS
23.	iP Z, P NE		11 18 01.6
	PP	Z	19 52
	S	NE	25 08
	i	N	10
	L	E	28 53
	Lr	Z	31 50
	L	NE	54
	P: S, W, C		
	Mag. 6¾-7 (Mat.)		
	56.6 N., 152.9 W.		
	Kodiak I. region.		
	h: 36 km ca.		
	H= 11 09 15.3		USCGS
23.	iP NZ, P E		11 32 45.5
	P: N, C		
	8.9 S., 123.6 E.		
	Flores I. region.		

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Date	Phase	Comp.	Time(GMT) h m s
	h: 23 km ca.		
	H= 11 24 13.6		USCGS
23.	iP NZ, P E		12 32 10.0
	P: N, C		
	56.7 N., 152.8 W.		
	Kodiak I. region.		
	h: 29 km ca.		
	H= 12 02 46.2		USCGS
23.	iP	Z	14 02 11.1
	iS	NEZ	12.7
	P: D		
23.	P	Z	14 31 30
	56.3 N., 152.3 W.		
	Kodiak I. region.		
	h: 33 km ca.		
	H= 14 22 45.2		USCGS
23.	P	Z	16 16 37
	i	Z	40
	PPP?	Z	18 42
	eS	N	22 35
	e	E	44
	L	NZ	25 40
	Lr	Z	26 09
	Mag. 5½ (Mat.)		
	4.1 S., 135.3 E.		
	West New Guinea region.		
	h: 34 km ca.		
	H= 16 09 01.3		USCGS
23.	eP	Z	17 04 42
	i	Z	59
	2.7 S., 127.9 E.		
	Ceram Sea.		
	h: 24 km ca.		
	H= 16 57 06		USCGS
23.	eP	Z	17 22 13
	S	E	38
23.	P	Z	18 51 21
	i	E	57
	i	E	52 05.4
	i	NE	17
23.	iP	EZ	19 06 12.0
	iS	NZ	16.0
23.	P	Z	20 21 35
	i	Z	43
	i	NE	45
	S	NE	22 30
23.	iP EZ, P N		20 57 46.3
	S	NEZ	50.3
	P: W, D		

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Date	Phase	Comp.	Time(GMT) h m s	
23.	P	NEZ	21 16 01	
	S	NE	28	
23.	P	Z	22 45 47.0	
	S	EZ	46 10.0	
24.	iP	NEZ	01 46 14.5	
	i	N	43	
	P: N, W, D			
24.	eP	Z	03 24 07	
	eL	N	31 30	
	51.2 N., 177.0 E.			
	Rat Is.			
	h: 28 km ca.			
	H= 03 17 46.3		USCGS	
24.	P	Z	03 42 54.1	
	i	N	55.0	
	S	N	43 59	
	P: C			
24.	iPKP1	Z	03 49 27.5	
	i	NE	29	
	PKP2	E	58	
	PKP: D			
	18.1 S., 69.7 W.			
	Northern Chile.			
	h: 80 km ca.			
	H= 03 29 46.2		USCGS	
24.	iP Z, P N		04 49 56.0	
	i	NE	56.5	
	iS	N	50 40.0	
	i	NE	40.5	
	P: D			
	35.5 N., 135.4 E.			
	Southern Honshu, Japan.			
	h: 356 km ca.			
	H= 04 48 59.8		USCGS	
24.	iP	Z	07 10 34.8	
	i	N	42.4	
	i	N	54	
	iS N, S E		11 10.8	
	P: C			
24.	P	Z	07 51 29.1	
	i	NZ	29.5	
	i	E	30.0	
	PP	Z	52 35	
	S	E	56 28	
	i	NE	31	
	ScP?	Z	58 08.0	
	L	E	12	
	L	N	45	
	Lr	Z	08 00 14	
	P: C			
	Mag. 5½ (Mat.)			

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Date	Phase	Comp.	Time(GMT) h m s	
	7.0 N., 126.2 E.			
	Mindanao, P. I.			
	h: 50 km ca.			
	H= 07 45 13.6		USCGS	
24.	iP	Z	12 59 13.4	
	iS	NE	21.4	
	P: C			
24.	iP	NEZ	14 19 53.4	
	i	N	55.0	
	i	Z	20 27	
	eS	E	28 49	
	eL	E	42 54	
	P: S, E, D			
	23.6 S., 176.7 W.			
	South of Fiji Is.			
	h: 91 km ca.			
	H= 14 08 31.2		USCGS	
24.	P	Z	16 30 50.4	
	i	NE	50.8	
	S	NE	32 24	
	P: C			
	44.5 N., 142.0 E.			
	Hokkaido, Japan region.			
	h: 174 km ca.			
	H= 16 28 50		USCGS	
24.	PKP	Z	17 13 27	
	pPKP	Z	14 24	
	15.4 S., 70.2 W.			
	Southern Peru.			
	h: 177 km ca.			
	H= 16 54 02		USCGS	
24.	P	Z	18 02 48	
	i	N	53	
	eS	N	04 59	
	L	N	05 32	
	L	E	54	
	44.1 N., 149.3 E.			
	Kurile Is.			
	h: 33 km ca.			
	H= 18 00 06.3		USCGS	
24.	P	Z	23 13 34	
	i	N	42	
	i	E	43.5	
	i	Z	14 08	
	eS	E	17 50	
	i	E	58	
	eL	N	24 40	
	20.1 N., 120.8 E.			
	Philippine Is. region.			
	h: 33 km ca.			
	H= 23 08 40.4		USCGS	

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Date	Phase	Comp.	Time(GMT) h m s
25.	P	EZ	06 16 22
	i	Z	25
	S	N	49
	i	Z	17 05
25.	iP	EZ	08 23 27.8
	S	N	48
	P: E, D		
25.	iP NZ, P E		12 24 35.8
	i	NE	44
	S	E	25 03
	i	N	05.0
	P: S, W, C		
25.	eL	N	13 02 44
	eL	N	04 19
	9.6 N., 126.3 E.		
	Mindanao, P. I.		
	h: 70 km ca.		
	H= 12 50 29.7		USCGS
25.	iP Z, P E		15 31 42.1
	P: W, D		
25.	iP	NEZ	15 35 55.3
	i	NE	36 20
	P: N, E, D		
25.	iP	NZ	17 38 48.5
	i	E	49.0
	i	N	54
	S	E	39 48
	S	N	49
	P: S, D		
25.	iP	Z	21 44 08.2
	i	NEZ	08.5
	i	N	12.0
	i	Z	30
	S	N	40
	i	E	45 01
	P: C		
	35.8 N., 140.9 E.		
	Near east coast of Honshu, Japan.		
	h: 65 km ca.		
	H= 21 43 31.9		USCGS
26.	P	Z	00 42 54
	i	E	56
	S	N	43 38
	i	E	44
26.	P	Z	01 48 21
	S	N	38
	i	E	40
26.	iP	NZ	02 10 08.0
	P: S, C		

Date	Phase	Comp.	Time(GMT) h m s
26.	eP	Z	04 43 15
	i	Z	19
	i	Z	43
26.	iP	EZ	16 50 06.0
	i	E	12
	i	NE	18
	eS	E	51 54
	L	E	53 27
	L	N	47
	P: E, C		
	29.8 N., 130.4 E.		
	Ryukyu Is.		
	h: 34 km ca.		
	H= 16 47 50.7		USCGS
26.	eP	Z	20 36 57
	e	E	43 52
	8.2 N., 141.6 E.		
	West Caroline Is.		
	h: 33 km ca.		
	H= 20 31 05		USCGS
26.	eP	Z	21 28 37
	e	E	38 33
26.	eP	Z	22 21 19
	51.4 N., 178.7 W.		
	Andreanof Is.		
	h: 43 km ca.		
	H= 22 14 36		USCGS
27.	eP	Z	01 13 12
	e	N	14 14
	e	Z	32
	eL	E	26 55
	L	E	28 47
	L	N	58
	Mag. 5½ (Mat.)		
	9.2 N., 94.1 E.		
	Nicobar Is. region.		
	h: 8 km ca.		
	H= 01 04 23.8		USCGS
27.	P	Z	04 00 45
	i	E	46
	i	N	47
	2.6 N., 127.8 E.		
	Molucca Passage.		
	h: 219 km ca.		
	H= 03 54 18		USCGS
27.	P	Z	07 26 15
	i	NZ	15.5
	i	E	16.0
	S	NZ	27 38
	29.6 N., 138.2 E.		
	South of Honshu, Japan.		
	h: 471 km ca.		
	H= 07 24 30		USCGS

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Date	Phase	Comp.	Time(GMT) h m s
27.	P	Z	08 51 13
	5.8 S., 104.1 E.		
	Southern Sumatra.		
	h: 94 km ca.		
	H= 08 42 04.8		USCGS
27.	PKP	Z	10 05 15
	54.5 S., 5.6 E.		
	Bouvet I. region.		
	h: 33 km ca.		
	H= 09 45 48.0		USCGS
27.	iP	Z	11 07 30.5
	e	E	17 28
	e	N	24 59
	P: C		
	4.5 S., 123.5 E.		
	Banda Sea.		
	h: 33 km ca.		
	H= 10 59 32		USCGS
27.	iP	Z	11 18 24.5
	PcP	Z	19 28
	60.3 N., 141.2 W.		
	Southeastern Alaska.		
	h: 12 km ca.		
	H= 11 08 55.9		USCGS
27.	P	EZ	11 22 31.4
	i	NEZ	40.0
	i	E	48
	P: D		
	30.5 N., 132.7 E.		
	Southeast of Shikoku, Japan.		
	h: 26 km ca.		
	H= 11 20 39		USCGS
27.	P	Z	11 40 32.2
	i	E	34
	i	N	37
	i	Z	43
	S	NE	44 25
	Lq	N	45 19
	L	NE	41
	Lr	Z	46 35
	P: D		
	Mag. 6-6¼ (Mat.)		
	23.8 N., 121.5 E.		
	Taiwan.		
	h: 24 km ca.		
	H= 11 36 08.6		USCGS
27.	P	Z	11 45 14
27.	iP	Z	11 46 10.6
	i	E	12.0
	i	Z	13.0
27.	P	Z	11 49 15

(cont.)

Date	Phase	Comp.	Time(GMT) h m s
	i	EZ	11 49 22
	i	NE	23
27.	P	Z	12 51 13
	i	NE	17
	i	NEZ	26
	S	Z	52 07
27.	iP	Z	14 51 58.0
	P: C		
	52.0 N., 176.6 E.		
	Rat Is.		
	h: 51 km ca.		
	H= 14 45 42.1		USCGS
27.	P	Z	17 41 40.0
	i	Z	42 04.1
	L	E	49 18
	L	E	51 05
	P: D		
	4.9 N., 127.5 E.		
	Talaud Is.		
	h: 85 km ca.		
	H= 17 35 13.0		USCGS
27.	iP	NZ	18 43 41.7
	i	E	42.0
	P: N, C		
	33.0 N., 140.2 E.		
	Near Hachijo-Zima, Japan.		
	h: 150 km ca.		JMA
27.	iP	Z	18 43 55.7
	i	NE	56.0
	i	Z	56.9
	S	Z	44 42
	33.1 N., 133.9 E.		
	South of Honshu, Japan.		
	h: 145 km ca.		
	H= 18 42 59		USCGS
27.	P	Z	19 45 08.4
	i	NZ	14
	e	E	46 48
27.	iP	Z	20 46 27
	i	Z	48
	P: C		
27.	P	Z	22 01 31.4
	i	NE	32.1
	i	N	38
	e	N	50
	e	E	03 48
	e	N	57
	30.2 N., 132.7 E.		
	Southeast of Shikoku, Japan.		
	h: 10 km ca.		
	H= 21 59 35		USCGS

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Date	Phase	Comp.	Time(GMT) h m s
27.	P	Z	23 00 01
	i	NEZ	10
27.	P	EZ	23 19 29
	i	N	41
	i	Z	44
27.	P	Z	23 26 33
	i	E	34.0
	i	NEZ	42
28.	eP	Z	00 11 51
	L	E	16 42
	23.6 N., 121.5 E.		
	Taiwan.		
	h: 31 km ca.		
	H= 00 07 32.1		USCGS
28.	eL	E	01 38 43
28.	eP	Z	02 36 36
	i	Z	38
	i	N	39
	48.9 N., 155.0 E.		
	Kurile Is.		
	h: 33 km ca.		
	H= 02 32 34		USCGS
28.	eP	Z	03 08 19
	i	Z	22.5
	i	E	24
28.	iP NZ, P E		03 41 36.5
	PP	Z	43 09
	PcP	Z	26
	i	NEZ	47 15
	eS	E	46
	ScS	E	51 40
	Lr	Z	54 40
	P: N, C		
	Mag. 6-6¼ (Mat.)		
	5.1 S., 153.0 E.		
	New Ireland region.		
	h: 50 km ca.		
	H= 03 33 36.5		USCGS
28.	iP	Z	04 02 59.7
	i	Z	04 10
	P: D		
28.	P	Z	04 05 36
	i	Z	56
28.	iP	Z	04 35 44.9
	i	NE	36 21
	P: C		
28.	P	NZ	05 17 47
	i	Z	47.5

(cont.)

Date	Phase	Comp.	Time(GMT) h m s
	i	E	05 17 48.0
	i	E	56
28.	P	Z	11 32 34
	i	Z	38
	i	NE	39
28.	P	EZ	15 49 14
	eS	N	52 43
	L	E	53 08
	L	N	54 14
	23.9 N., 121.6 E.		
	Taiwan.		
	h: 33 km ca.		
	H= 15 44 53.8		USCGS
28.	iP	NZ	18 07 56.9
	i	E	57.1
	sP	Z	10 37
	P: S, D		
	21.0 S., 178.9 W.		
	Fiji Is. region.		
	h: 562 km ca.		
	H= 17 57 39.7		USCGS
29.	iP Z, P N		00 27 10.2
	i	E	11.3
	iS	E	31.5
	i	N	32.0
	P: S, D		
29.	P	Z	00 49 29.5
	S	NE	50 05.5
29.	iP	Z	02 07 06
	i	NE	07.1
	S	E	09 22
	i	N	33
	L	N	10 07
	L	E	44
	P: C		
	44.4 N., 149.4 E.		
	Kurile Is.		
	h: 33 km ca.		
	H= 02 04 22.6		USCGS
29.	iP Z, P NE		02 16 17.5
	P: D		
	13.8 S., 170.6 E.		
	New Hebrides Is. region.		
	h: 636 km ca.		
	H= 02 07 18.1		USCGS
29.	iP	Z	02 25 24.5
	S	NE	51.6
	P: D		
29.	iP	NEZ	04 48 00.9
	iS	NEZ	16.8
	P: S, W, D		

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Date	Phase	Comp.	Time(GMT) h m s
29.	eP	Z	05 11 38
	i	NEZ	59
	eL	NE	14 27
	eL	NE	15 54
	44.2 N., 149.0 E.		
	Kurile Is.		
	h: 33 km ca.		
	H= 05 09 03.9		USCGS
29.	iP	Z	06 40 49.9
	i	E	50.5
	i	N	51.0
	S	E	41 06.5
	P: C		
29.	iP NZ, P E		07 33 04.0
	iS	NEZ	09.0
	P: N, W, C		
29.	eL	E	09 14 22
	8.3 N., 103.3 W.		
	Off coast of Mexico.		
	h: 33 km ca.		
	H= 08 23 54		USCGS
29.	iP	Z	10 33 50.3
	i	E	50.5
	i	N	51
	iS	N	34 18.0
	P: C		
29.	iP	NEZ	11 56 46.5
	iS	E	51.7
	P: S, W, C		
29.	iP	Z	13 43 15.5
	i	EZ	16.7
	eS	NE	48
	P: C		
29.	iP	Z	15 29 42.6
	P: C		
	18.5 S., 169.0 E.		
	New Hebrides Is.		
	h: 212 km ca.		
	H= 15 19 43.9		USCGS
29.	iP Z, P NE		16 04 02.0
	i	Z	13.8
	eS	E	06 30
	eL	E	07 54
	P: N, E, D		
	45.3 N., 150.7 E.		
	Kurile Is.		
	h: 21 km ca.		
	H= 16 00 57.4		USCGS
29.	P	Z	17 29 28
	i	Z	49

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Date	Phase	Comp.	Time(GMT) h m s
	eS	N	17 32 04
	e	E	40
	L	E	33 45
	43.9 N., 149.4 E.		
	Kurile Is. region.		
	h: 33 km ca.		
	H= 17 26 46		USCGS
29.	iP	Z	20 15 16.9
	S	NZ	20
	P: C		
29.	iP	NEZ	22 13 20.7
	S	EZ	39
	P: E, D		
30.	P	Z	00 40 51
	i	NEZ	53.5
	i	NE	41 01
	S	NE	41
30.	iP	NEZ	01 12 18.2
	P: E, D		
30.	iP	NZ	01 13 43.1
	S	N	59.0
	P: C		
30.	P	NZ	03 00 42
	i	N	58
	PP	Z	02 22
	PPP	Z	52
	S	N	06 47
	eLq	E	09 38
	Lr	Z	12 22
	Mag. 6 (Mat.)		
	1.6 S., 126.7 E.		
	Molucca Sea.		
	h: 33 km ca.		
	H= 02 53 14.0		USCGS
30.	eP	Z	03 08 17
	i	Z	28
	26.0 N., 126.6 E.		
	Ryukyu Is.		
	h: 109 km ca.		
	H= 03 04 53		USCGS
30.	P	NZ	05 31 59
	i	N	32 29
30.	iP	Z	05 40 56.8
	S	N	41 22
	P: N, C		
30.	iP	NZ	08 39 46.3
	PcP	Z	42 40
	S	NE	44 49
	L	N	46 45

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Date	Phase	Comp.	Time(GMT) h m s
	L	Z	08 47 30
	P: S, C		
	Mag. $5\frac{3}{4}$ (Mat.)		
	51.7 N., 176.5 E.		
	Rat Is.		
	h: 60 km ca.		
	H= 08 33 31.8		USCGS
30.	iP	Z	10 44 35.0
	i	N	48
	P: C		
30.	PKP1	Z	11 32 23
	iPKP2	Z	37.5
	21.3 S., 66.5 W.		
	Southern Bolivia.		
	h: 191 km ca.		
	H= 11 12 46.6		USCGS
30.	iP	NZ	12 41 45.8
	S	E	45 52
	eL	E	48 28
	P: N, D		
	53.7 N., 160.5 E.		
	Near east coast of Kamchatka.		
	h: 33 km ca.		
	H= 12 36 40.8		USCGS
30.	P	NZ	13 03 01.8
	e	N	42
	P: N, D		
30.	iP	Z	16 12 28.6
	i	N	29
	i	E	31
	S	NE	13 02
	P: C		
30.	P	Z	17 17 07
	S	N	22 23
	eL	E	24 18
	51.8 N., 176.5 E.		
	Rat Is.		
	h: 59 km ca.		
	H= 17 10 53.1		USCGS
30.	iP	NZ	19 13 37.3
	P: N, C		
30.	iP	Z	20 09 52.6
	i	Z	59.0
	i	Z	10 06
	eS	N	09
	P: C		
30.	P	NZ	20 19 46
	i	Z	49
	i	NZ	20 17
	S	N	21
	i	E	54
30.	P	Z	20 27 00.5
	i	NZ	02.4
	i	Z	05.5
	S	NEZ	33
	P: C		
30.	P	Z	20 29 40
	eS	N	30 12
30.	P	Z	20 32 22
	i	NE	24
	eS	Z	57
30.	P	Z	20 34 37
	eS	N	35 13
30.	iP	Z	20 53 49.0
	eS	N	54 26
	P: D		
30.	iP	Z	23 16 01.9
	eS	NZ	33
	P: N, C		
30.	iP	Z	23 16 43.5
	P	NE	44.0
	S	N	17 02
	i	N	07
	P: D		

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