



10 JUN 1970
International
Seismological
Centre

Matsushiro Seismological Observatory, Japan

Seismological Station

SEISMOLOGICAL BULLETIN

OF

MATSUSHIRO

Latitude 36° 31' 30" N
Longitude 138° 12' 30" E
Elevation 467 m

Instrumental Constants

JULY , AUGUST

| Instrument | Comp. | T ₁ | | T ₂ | | Gain ratio | Magnification |
|--|-------|----------------|------|----------------|-----|------------|---------------|
| Short Period Seismograph | N | 1.0 | 0.22 | 0.63 | 1.7 | 21.75 | 21.75 (max) |
| | E | 1.0 | 0.22 | 0.64 | 1.6 | 21.75 | 21.75 (max) |
| | Z | 1.0 | 0.21 | 0.67 | 1.2 | 21.75 | 21.75 (max) |
| Short Period Seismograph (Long Period) | N | 1.6 | 83 | 0.63 | 2.5 | 3,225 | 3,225 (max) |
| | E | 1.0 | 55 | 0.64 | 2.5 | 3,225 | 3,225 (max) |
| | Z | 1.0 | 64 | 0.67 | 2.2 | 3,225 | 3,225 (max) |
| WSS Seismograph (Short Period) | N | 1.0 | 0.75 | | | 10.0 | 10.0 |
| | E | 1.0 | 0.75 | | | 10.0 | 10.0 |
| | Z | 1.0 | 0.75 | | | 10.0 | 10.0 |
| WSS Seismograph (Long Period) | N | 15 | 100 | | | 10.0 | 10.0 |
| | E | 15 | 100 | | | 10.0 | 10.0 |
| | Z | 15 | 100 | | | 10.0 | 10.0 |
| Short Period Vertical Seismograph | Z | 1.0 | 0.22 | 0.64 | 1.2 | 21.75 | 21.75 (max) |
| Wood-Anderson Seismograph | Z | | | | | 1.0 | 1.0 |

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

July, 1969
Date Phase Comp. Time(GMT) Date Phase Comp. Time(GMT)
1. IP Z 09 13 30.8 2. P 2. P N 12 14 32.0
IX N 31.8 17 07
IX N 31.8 23
S E 51 25
IX N 34 25
36.2 N., 140.3 E.
Honshu, Japan.
ht 60 km.
H= 09 13 02.3

Matsushiro Seismological Observatory, Japan

Seismological Bulletin

1. P Z 17 41 56
S N 42 49
1. P Z 18 33 27
15.9 S., 173.1 W.
Tonga Is.
ht 263 km.
H= 18 22 52.8

Latitude 36° 32' 30"N.
Longitude 138° 12' 32"E.
Elevation 440 M.

Instrumental Constants

| Instruments | Comp. | Period(sec.) | Damping ratio | Magnification |
|--|-------|--|--|---------------|
| Benioff Seismograph (Short Period) | N | T ₁ = 1.0 T ₂ = 0.23 | h ₁ = 0.63 h ₂ = 1.7 | 46,000 (max) |
| | E | T ₁ = 1.0 T ₂ = 0.22 | h ₁ = 0.64 h ₂ = 1.6 | 46,000 (max) |
| | Z | T ₁ = 1.0 T ₂ = 0.21 | h ₁ = 0.67 h ₂ = 1.2 | 47,000 (max) |
| Benioff Seismograph (Long Period) | N | T ₁ = 1.0 T ₂ = 89 | h ₁ = 0.63 h ₂ = 2.5 | 3,200 (max) |
| | E | T ₁ = 1.0 T ₂ = 55 | h ₁ = 0.64 h ₂ = 2.5 | 4,700 (max) |
| | Z | T ₁ = 1.0 T ₂ = 64 | h ₁ = 0.67 h ₂ = 2.7 | 3,500 (max) |
| WWSS Seismograph (Short Period) | N | T ₁ = 1.0 T ₂ = 0.75 | | 100,000 |
| | E | T ₁ = 1.0 T ₂ = 0.75 | | 100,000 |
| | Z | T ₁ = 1.0 T ₂ = 0.75 | | 100,000 |
| WWSS Seismograph (Long Period) | N | T ₁ = 15 T ₂ = 100 | | 3,000 |
| | E | T ₁ = 15 T ₂ = 100 | | 3,000 |
| | Z | T ₁ = 15 T ₂ = 100 | | 3,000 |
| Short Period Vertical Seismograph | Z | T ₁ = 1.0 T ₂ = 2.82 | h ₁ = 1.4 h ₂ = 1.2 | 32,000 (max) |
| Wood-Anderson Seismograph | N | T = 0.8 | h = 0.3 | 1,300 |
| | E | T = 0.8 | h = 0.8 | 1,200 |

July, 1969

| Date | Phase | Comp. | Time(GMT) h m s | Date | Phase | Comp. | Time(GMT) h m s |
|------|---|------------------------|---|------|---|--|---|
| 1. | iP iX iX S iX | Z EZ N E N | 09 13 30.8 31.5 31.8 51 54 | 2. | iP Z, P N X iX S P: D | N N Z N | 12 16 02.0 17 07 09 45 |
| | 36.2 N., 140.3 E. Honshu, Japan. h: 60 km. H= 09 13 02.9 JMA | | | | 43.9 N., 145.8 E. Hokkaido, Japan. h: 102 km. H= 12 13 47.3 USCGS | | |
| 1. | eP eS | Z N | 17 41 56 42 49 | 2. | iP P iX iX S N, eS E SS Lq Lr | NZ E EZ N E NE NE Z | 17 39 11.6 12 22 22 49 08 54 08 59 10 18 03 30 |
| 1. | P | Z | 18 33 27 | | P: N, C 28.3 S., 176.5 W. Kermadec Is. h: 8 km. H= 17 27 15.7 USCGS | | |
| | 15.9 S., 175.1 W. Tonga Is. h: 263 km. H= 18 22 52.8 USCGS | | | | | | |
| 1. | iP iP X | Z N N | 20 44 40.4 40.7 45 50 | 3. | iP Z, P N P: C | | 02 39 15.3 |
| | P: N, C 39.6 N., 142.3 E. Off east coast of Honshu, Japan. h: 50 km. H= 20 43 32.5 JMA | | | 3. | iP iP eS eLq Lr Lr | Z N NE E Z N | 06 40 55.5 56.0 45 42 47 30 40 00 12 |
| 2. | P P | NZ E | 01 51 45 46 | | P: S, C 7.1 N., 126.7 E. Mindanao, P.I. h: 97 km. H= 06 34 46.0 USCGS | | |
| 2. | iP iX iX P: C | Z Z N | 08 05 55.8 06 15 18 | 3. | eP | Z | 07 17 42 |
| | P: C 5.4 S., 147.0 E. East New Guinea. h: 219 km. H= 08 21 48.6 USCGS | | | 3. | P S | Z NE | 11 00 01 09 |
| 2. | iP P: C | Z | 08 29 24.6 | 3. | P ePP | NZ Z | 14 14 03 15 11 |
| | P: C 5.4 S., 147.0 E. East New Guinea. h: 219 km. H= 08 21 48.6 USCGS | | | | 4.4 S., 128.4 E. Banda Sea. h: 193 km. H= 14 06 33.6 USCGS | | |
| 2. | P iX S N, eS E L L | Z N E N EZ | 10 07 00 04 12 48 15 04 18 00 | 3. | eP eX iX | EZ N Z | 16 22 39 55 23 23 |
| | 20.7 N., 99.4 E. Burma. h: N. H= 09 59 53.4 USCGS | | | | | | |
| 2. | P eS | Z NZ | 10 35 09 58 | 3. | iP S iX | NEZ N E | 18 00 18.6 48 54 (cont.) |



July, 1969

| Date | Phase | Comp. | Time(GMT) h m s | Date | Phase | Comp. | Time(GMT) h m s |
|------|----------------------------------|-------|--------------------|----------|-------|-------|--------------------|
| | P: S, E, D | | | 4. | P | NZ | 08 53 27 |
| | 36.7 N., 141.1 E. | | | iX | Z | | 27.7 |
| | Off east coast of Honshu, Japan. | | | iX | E | | 27.9 |
| | h: 40 km. | | | iX | Z | | 37 |
| | H= 17 59 40.7 JMA | | | iX | N | | 47 |
| | | | | S | NE | | 54 10 |
| 3. | iP | NZ | 18 08 07.8 | | | | |
| | iP | E | 08.5 | | | | |
| | S | NE | 13 12 | | | | |
| | Lq | N | 14 50 | | | | |
| | Lr | Z | 16 46 | | | | |
| | P: S, E, C | | | 4. | SS | NEZ | 11 53 00 |
| | 51.7 N., 178.0 E. | | | Lq | NE | | 12 07 00 |
| | Rat Is. | | | Lr | Z | | 14 00 |
| | h: 84 km. | | | | | | |
| | H= 18 01 48.5 USCGS | | | | | | |
| | | | | | | | |
| 3. | eP | Z | 20 26 12 | | | | |
| | eX | N | 14 | | | | |
| | eS | N | 27 24 | | | | |
| | | | | | | | |
| 3. | eL | N | 21 54 00 | 4. | iP | NEZ | 14 16 21.3 |
| | L | EZ | 22 00 00 | S? | N | | 29 |
| | | | | iX | EZ | | 31 |
| | | | | | | | |
| 3. | P | Z | 23 53 52 | | | | |
| | iX | Z | 54 02.5 | 4. | P | Z | 15 33 18 |
| | iX | NE | 03 | S NE, eS | Z | | 34 |
| | X | Z | 55 52 | | | | |
| | eX | N | 56 | 4. | P | Z | 18 39 33 |
| | | | | | | | |
| | 41.5 N., 142.5 E. | | | | | | |
| | South coast of Hokkaido, Japan. | | | | | | |
| | h: 0 km. | | | | | | |
| | H= 23 52 17.9 JMA | | | | | | |
| | | | | | | | |
| 4. | P | Z | 02 23 00 | 4. | iP | EZ, P | 20 10 25.6 |
| | eS | N | 16 | eS | N | | 47 |
| | S | Z | 17 | iX | Z | | 48 |
| | | | | | | | |
| 4. | P | E | 06 59 42 | | | | |
| | iP | Z | 42.3 | | | | |
| | iP | N | 42.5 | | | | |
| | sS | N | 07 11 54 | | | | |
| | sS | E | 12 24 | | | | |
| | | | | | | | |
| | P: N, D | | | | | | |
| | 20.0 S., 178.6 W. | | | | | | |
| | Fiji Is. | | | | | | |
| | h: 650 km. | | | | | | |
| | H= 06 49 35.3 USCGS | | | | | | |
| | | | | | | | |
| 4. | P | NEZ | 07 12 31 | | | | |
| | | | | | | | |
| 4. | eL | N | 07 27 00 | 4. | iP | Z | 23 13 24.3 |
| | L | EZ | 34 00 | P | N | | 25 |
| | | | | eS? | N | | 42 |
| | 4.1 S., 80.9 W. | | | | | | |
| | Peru - Ecuador border. | | | | | | |
| | h: N. | | | | | | |
| | H= 06 32 43.4 USCGS | | | 5. | iP | Z | 01 43 46.7 |
| | | | | P | NE | | 47 |

| Date | Phase | Comp. | Time(GMT) h m s | Date | Phase | Comp. | Time(GMT) h m s |
|------------|----------------------------------|-------|--------------------|------|-------|-------|--------------------|
| July, 1969 | | | | | | | |
| 1. | iP | Z | 09 13 30.8 | | | | |
| | iX | EZ | 31.5 | | | | |
| | iX | N | 31.8 | | | | |
| | S | E | 51 | | | | |
| | iX | N | 54 | | | | |
| | | | | | | | |
| | 36.5 N., 140.5 E. | | | | | | |
| | Honshu, Japan. | | | | | | |
| | h: 60 km. | | | | | | |
| | H= 09 13 02.9 JMA | | | | | | |
| | | | | | | | |
| 1. | iP | Z | 18 33 57 | | | | |
| | iX | EZ | 41 50 | | | | |
| | iX | N | 43 53 | | | | |
| | S | E | 43 53 | | | | |
| | | | | | | | |
| | 15.9 S., 175.1 W. | | | | | | |
| | Tonga Is. | | | | | | |
| | h: 263 km. | | | | | | |
| | H= 18 22 52.9 USCGS | | | | | | |
| | | | | | | | |
| 1. | iP | Z | 20 44 40.4 | | | | |
| | iX | EZ | 43 50 | | | | |
| | iX | N | 45 50 | | | | |
| | S | E | 45 50 | | | | |
| | | | | | | | |
| | 39.5 N., 142.5 E. | | | | | | |
| | Off east coast of Honshu, Japan. | | | | | | |
| | h: 50 km. | | | | | | |
| | H= 23 52 17.9 JMA | | | | | | |
| | | | | | | | |
| 2. | P | Z | 01 51 45 | | | | |
| | E | E | 49 | | | | |
| | | | | | | | |
| | 08 03 55.8 | | | | | | |
| | 08 15 | | | | | | |
| | 13 | | | | | | |
| | | | | | | | |
| | 08 29 24.8 | | | | | | |
| | | | | | | | |
| | 5.4 S., 170.0 E. | | | | | | |
| | East New Guinea. | | | | | | |
| | h: 219 km. | | | | | | |
| | H= 08 21 48.6 USCGS | | | | | | |
| | | | | | | | |
| 2. | P | Z | 10 07 00 | | | | |
| | iX | N | 04 | | | | |
| | S | E | 12 58 | | | | |
| | | | | | | | |
| | 20.7 N., 93.4 E. | | | | | | |
| | Burma. | | | | | | |
| | h: N. | | | | | | |
| | H= 09 23 23.4 USCGS | | | | | | |
| | | | | | | | |
| 2. | P | Z | 10 32 09 | | | | |
| | S | E | 38 | | | | |

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| Date | Phase | Comp. | Time(GMT) h m s | Date | Phase | Comp. | Time(GMT) h m s |
|------|--|-------|-------------------------------------|------|--|-------|--------------------|
| | | | h: 42 km. H= 03 37 54.8 USCGS | | iP | N | 02 28 13.8 |
| | | | | | S | N | 35 |
| | | | | | P: N,W,D | | |
| 7. | iP Z, P N | | 04 48 03.5 | 8. | iP | Z | 02 59 20.4 |
| | iP | E | 04.0 | | P | NE | 21 |
| | iX | Z | 49 18 | | iX | E | 25 |
| | S | NEZ | 52 00 | | iX | N | 27 |
| | L | N | 54 00 | | S | N | 42 |
| | L | Z | 08 | | S | EZ | 43 |
| | L | E | 14 | | P: D | | |
| | P: E,C 16.5 N., 147.3 E. Mariana Is. h: 38 km. H= 04 43 15.4 USCGS | | | | 36.0 N., 140.3 E. Honshu, Japan. h: 40 km. H= 02 58 50.6 JMA | | |
| 7. | iP | Z | 06 00 44.2 | 8. | iP | Z | 03 23 09.8 |
| | iP | N | 44.5 | | P | NE | 10 |
| | P | E | 45 | | S | N | 32 |
| | P: N,C 50.3 N., 149.8 E. Sea of Okhotsk. h: 420 km. H= 05 57 19.8 USCGS | | | | P: C | | |
| 7. | iP | NZ | 14 28 33.8 | 8. | iP | NZ | 04 13 40.8 |
| | eS | N | 57 | | P | E | 41 |
| | P: S,D | | | | PcP | Z | 16 08 |
| | | | | | S | NE | 19 12 |
| 7. | eP | NZ | 21 44 55 | | Lq | NE | 21 24 |
| | eS | N | 46 23 | | Lq | Z | 54 |
| | 42.1 N., 142.5 E. South coast of Hokkaido, Japan. h: 70 km. H= 21 43 19.3 JMA | | | | Lr | NZ | 24 00 |
| | | | | | P: N,C Mag. 5 1/2 - 5 1/2 (Mat.) 2.1 N., 126.6 E. Molucca Passage. h: 16 km. H= 04 06 39.7 USCGS | | |
| 7. | iP | NZ | 22 53 30.0 | 8. | iP | Z | 05 30 45.2 |
| | S | N | 54 12 | | iP | N | 45.5 |
| | S | Z | 13 | | S N, eS E P: N,D | | |
| | P: N,C 34.0 N., 134.7 E. Honshu, Japan. h: 50 km. H= 22 52 32.0 JMA | | | | | | |
| 8. | P | EZ | 00 07 37 | 8. | P | Z | 08 21 59 |
| | P | N | 38 | | iX | E | 22 16 |
| | iX | E | 45 | | iX | NZ | 18 |
| | S | Z | 08 13 | | S | NE | 32 24 |
| | iX | N | 22 | | S | Z | 40 |
| | 35.5 N., 141.1 E. Near east coast of Honshu, Japan. h: 30 km. H= 00 06 56.0 JMA | | | | SS | N | 38 12 |
| | | | | | iX | Z | 39 08 |
| 8. | iP | Z | 02 28 13.2 | | L | NZ | 51 00 |
| | iP | E | 13.4 | | L | E | 55 00 |
| | (cont.) | | | | L | NZ | 09 04 00 |
| | | | | | Mag. 6 1/2 (Mat.) 37.6 N., 20.3 E. Ionian Sea. h: N. H= 08 09 17.5 USCGS | | |
| | | | | 8. | iP | NZ | 10 28 59.4 |
| | | | | | P | E | 29 00 |
| | | | | | (cont.) | | |

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| Date | Phase | Comp. | Time(GMT) h m s | Date | Phase | Comp. | Time(GMT) h m s |
|------|--|-------|-------------------------------------|------|-------|-------|--------------------|
| | | | h: 42 km. H= 03 37 54.8 USCGS | | | | |
| | | | | | | | |
| | | | | | | | |
| 7. | iP Z, P N | | 04 48 03.5 | | | | |
| | iP | E | 04.0 | | | | |
| | iX | Z | 49 18 | | | | |
| | S | NEZ | 52 00 | | | | |
| | L | N | 54 00 | | | | |
| | L | Z | 08 | | | | |
| | L | E | 14 | | | | |
| | P: E,C 16.5 N., 147.3 E. Mariana Is. h: 38 km. H= 04 43 15.4 USCGS | | | | | | |
| 7. | iP | Z | 06 00 44.2 | | | | |
| | iP | N | 44.5 | | | | |
| | P | E | 45 | | | | |
| | P: N,C 50.3 N., 149.8 E. Sea of Okhotsk. h: 420 km. H= 05 57 19.8 USCGS | | | | | | |
| 7. | iP | NZ | 14 28 33.8 | | | | |
| | eS | N | 57 | | | | |
| | P: S,D | | | | | | |
| 7. | eP | NZ | 21 44 55 | | | | |
| | eS | N | 46 23 | | | | |
| | 42.1 N., 142.5 E. South coast of Hokkaido, Japan. h: 70 km. H= 21 43 19.3 JMA | | | | | | |
| 7. | iP | NZ | 22 53 30.0 | | | | |
| | S | N | 54 12 | | | | |
| | S | Z | 13 | | | | |
| | P: N,C 34.0 N., 134.7 E. Honshu, Japan. h: 50 km. H= 22 52 32.0 JMA | | | | | | |
| 8. | P | EZ | 00 07 37 | | | | |
| | P | N | 38 | | | | |
| | iX | E | 45 | | | | |
| | S | Z | 08 13 | | | | |
| | iX | N | 22 | | | | |
| | 35.5 N., 141.1 E. Near east coast of Honshu, Japan. h: 30 km. H= 00 06 56.0 JMA | | | | | | |
| 8. | iP | Z | 02 28 13.2 | | | | |
| | iP | E | 13.4 | | | | |
| | (cont.) | | | | | | |

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| Date | Phase | Comp. | Time(GMT) h m s | Date | Phase | Comp. | Time(GMT) h m s |
|------|---|-------|--------------------|------|---|-------|--------------------|
| | eX | N | 10 30 34 | | | | |
| | P: S, C 41.5 N., 143.1 E. Hokkaido, Japan. h: 45 km. H= 10 27 27.2 | | | | | | |
| 8. | eP | Z | 17 10 30 | 9. | P | NZ | 08 39 02 |
| | P | NE | 32 | | iX | Z | 46 |
| | 43.5 N., 135.6 E. Near east coast of Eastern Russia. h: 334 km. H= 17 08 44.7 | | | | iX | N | 57 |
| | | | | | iX | EZ | 58 |
| | | | | | 33.7 N., 135.0 E. Honshu, Japan. h: 50 km. H= 08 38 03.6 | | |
| 8. | P | NZ | 22 53 11 | 9. | iP | Z | 10 22 47.3 |
| | P | E | 12 | | iX | NE | 49 |
| | 14.0 N., 144.8 E. Mariana Is. h: 125 km. H= 22 48 13.4 | | | | iX | Z | 57 |
| | | | | | iX | NE | 58 |
| | | | | | iX | Z | 23 40 |
| | | | | | iX | N | 42 |
| | | | | | iX | E | 45 |
| 9. | iP | Z | 02 01 49.2 | | P: C 34.2 N., 135.1 E. Honshu, Japan. h: 10 km. H= 10 21 49.7 | | |
| | S | N | 06 44 | 9. | P | EZ | 14 32 50.5 |
| | L | NE | 08 00 | | iX | N | 52.0 |
| | L | Z | 09 20 | | S | N | 33 23 |
| | P: D 51.6 N., 174.8 E. Near Is., Aleutian Is. h: 22 km. H= 01 55 39.8 | | | 9. | eP | Z | 15 50 32 |
| | | | | | iX | NE | 35 |
| | | | | | iX | Z | 37 |
| 9. | P | Z | 02 45 13 | | iX | Z | 51 09 |
| | X | NEZ | 18 | | pP | N | 11 |
| | iX | NE | 23 | | 25.3 N., 122.1 E. Taiwan. h: 213 km. H= 15 46 37.5 | | |
| | S | NEZ | 52 | | | | |
| | 34.2 N., 136.5 E. Near south coast of Honshu, Japan. h: 30 km. H= 02 44 30.1 | | | 9. | iP | NEZ | 17 06 17.4 |
| | | | | | S | NEZ | 48 |
| | | | | | P: S, W, D | | |
| 9. | iP | NZ | 05 22 48.3 | 9. | iP | Z | 23 00 41.0 |
| | P | E | 49 | | P | NE | 42.0 |
| | P: N, C 12.9 N., 143.3 E. South of Mariana Is. h: 130 km. H= 05 17 44.4 | | | | P: S, D 8.8 S., 124.0 E. Timor. h: 34 km. H= 22 52 11.5 | | |
| | | | | | | | |
| 9. | P | Z | 08 15 09 | 9. | iP | NZ | 23 37 13.5 |
| | iX | NE | 22 | | iP | E | 14.2 |
| | S | N | 17 39 | | iS | NEZ | 41.5 |
| | eX | Z | 48 | | P: N, E, D | | |
| | eL | E | 19 00 | | | | |
| | L | N | 32 | 9. | iP | Z | 23 56 31.2 |
| | L | Z | 20 00 | | S | N | 58 |
| | 44.4 N., 149.6 E. (cont.) | | | | | | |

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| Date | Phase | Comp. | Time(GMT) h m s | Date | Phase | Comp. | Time(GMT) h m s |
|------|---|-----------------------------|--|------|--|------------------------|---------------------------------------|
| 10. | iPKP 1 PKP 1 iX PKP 2 PKP: D | Z NE Z Z | 09 02 21.2 22 39.4 50 | 11. | iP Z, P N iX S | Z NE | 08 57 39.8 58 13 56 |
| | 23.6 S., 69.7 W. Northern Chile. h: 48 km. H= 08 42 28.5 | | | | P: S,C 42.6 N., 142.3 E. South of Hokkaido, Japan. h: 110 km. H= 08 56 01.6 | | |
| | USCGS | | | | JMA | | |
| 10. | P iX iX eS | NZ N E N | 11 49 06 25 26 50 52 | 11. | iP eS | NZ NE | 10 39 05.3 40 13 |
| | 41.9 N., 142.2 E. Hokkaido, Japan. h: 82 km. H= 11 47 31.2 | | | | P: S,C 40.1 N., 142.9 E. Off east coast of Honshu, Japan. h: 30 km. H= 10 37 46.7 | | |
| | USCGS | | | | JMA | | |
| 10. | eP iX S N, eS iX N, X Z | Z E Z Z | 13 46 35 43 46 58 | 11. | iP Z, P N eS eX | N E | 11 50 49.9 51 52 52 26 |
| | P: C | | | | P: C | | |
| 10. | P iX | NZ EZ | 15 25 50.7 51.7 | 11. | P iX | Z N | 21 27 43 29 10.4 |
| 10. | iP iX S eS Lr | Z N E NZ Z | 19 17 28.8 31 20 46 48 21 48 | 11. | iP S | NEZ N | 21 58 54.2 59 14 |
| | P: D 49.3 N., 155.3 E. Kurile Is. h: 33 km. H= 19 13 20.9 | | | | P: S,E,D 35.6 N., 139.6 E. Honshu, Japan. h: 50 km. H= 21 58 27.7 | | |
| | USCGS | | | | JMA | | |
| 10. | iP P eS? eX X eL | NZ E E N N Z | 20 06 22.5 23 07 33 47 08 10 12 | 12. | P iX eX S iX | NZ Z N E Z | 02 35 41 49.8 36 30 39 40 |
| | P: N,D 41.1 N., 143.1 E. Near south coast of Hokkaido, Japan. h: 110 km. H= 20 04 53.2 | | | | 33.6 N., 135.6 E. Honshu, Japan. h: 10 km. H= 02 34 42.8 | | |
| | JMA | | | | JMA | | |
| 11. | P iX eS | Z N E | 07 10 51 59 11 29 | 12. | iP Z, P NE S | NE E | 05 37 52.4 38 20 |
| | P: S,W,D | | | | P: S,W,D | | |
| 11. | P iX S | Z Z NE | 07 45 18 23 55 | 12. | eP P | Z Z | 06 00 01 06 03 13 |
| | 22.8 S., 179.5 W. South of Fiji Is. h: 559 km. H= 05 52 48.7 | | | | P: S,W,D | | |
| | USCGS | | | | JMA | | |
| 12. | iP S | Z E | 06 08 53.4 18 32 | | (cont.) | | |

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| Date | Phase | Comp. | Time(GMT) h m s | Date | Phase | Comp. | Time(GMT) h m s |
|------|---|-------|--------------------|------|--|-------|--------------------|
| | S | N | 06 18 40 | 12. | P | Z | 23 20 46 |
| | eSS | E | 23 10 | | S | N | 21 18 |
| | eSSS? | EZ | 27 10 | | iX | E | 21 |
| | Lq | N | 29 16 | 13. | iP Z, P NE | | 00 19 15.0 |
| | Lr | EZ | 31 36 | | P: C | | |
| | P: D | | | | | | |
| | 6.0 S., 71.4 E. Chagos Archipelago. h: N. H= 05 57 11.1 USCGS | | | | | | |
| 12. | P | Z | 11 52 50 | 13. | iP | NEZ | 03 05 44.0 |
| | 7.9 S., 117.8 E. Bali Sea. h: 52 km. H= 11 44 12.3 USCGS | | | | S | E | 06 54 |
| | | | | | P: S, W, C 39.8 N., 143.9 E. Off east coast of Honshu, Japan. h: 30 km. H= 03 04 18.8 JMA | | |
| 12. | iP Z, P NE | | 13 04 07.0 | 13. | iP Z, P N | | 05 43 47.5 |
| | S | NE | 06 54 | | eS | E | 45 36 |
| | iX | E | 07 14 | | X | N | 48 |
| | L | NZ | 54 | | eL | EZ | 46 40 |
| | P: W, C 46.5 N., 153.3 E. Kurile Is. h: 12 km. H= 13 00 36.9 USCGS | | | | P: C 43.3 N., 147.4 E. Kurile Is. h: N. H= 05 41 25.5 USCGS | | |
| 12. | iP Z, P NE | | 13 27 24.0 | 13. | iP | Z | 06 04 36.6 |
| | pP | EZ | 29 37 | | iX | Z | 05 13 |
| | P: D 26.1 S., 178.3 E. South of Fiji Is. h: 603 km. H= 13 16 55.4 USCGS | | | | P: D | | |
| 12. | P | Z | 15 14 15 | 13. | P | Z | 08 20 49 |
| | iX | Z | 25 | | S | NZ | 21 15.5 |
| | 46.3 N., 153.1 E. Kurile Is. h: N. H= 15 10 47.1 USCGS | | | | S | E | 16.6 |
| 12. | iP Z, P NE | | 19 17 50.8 | 13. | P | Z | 11 39 30 |
| | iX | NEZ | 52.0 | | S | NE | 40 00 |
| | S | E | 18 55 | 13. | iP | NE | 14 07 42.2 |
| | iX | NE | 19 14 | | X | E | 43 |
| | P: C 39.7 N., 143.9 E. Off east coast of Honshu, Japan. h: 10 km. H= 19 16 24.9 JMA | | | | P: S, D 8.5 S., 158.9 E. Solomon Is. h: 533 km. H= 13 59 44.3 USCGS | | |
| 12. | iP Z, P NE | | 19 52 31.6 | 14. | P | Z | 00 14 02 |
| | eS | E | 53 37 | 14. | iP | Z | 06 00 41.0 |
| | P: C | | | | iX | NE | 41.2 |
| 12. | P | Z | 20 23 40 | | S | EZ | 01 11 |
| | iX | N | 52 | | iX | Z | 20 |
| | eS | N | 24 51 | | P: D 36.4 N., 141.2 E. Near east coast of Honshu, Japan. (cont.) | | |

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| Date | Phase | Comp. | Time(GMT) h m s | Date | Phase | Comp. | Time(GMT) h m s |
|------|-----------------------------|----------------|---|------|----------------------------|--------------------|---|
| | | | h: 50 km. H= 06 00 01.6 | 15. | iP iX S | NEZ E E | 02 36 46.8 51 56 |
| | | | JMA | | | | |
| 14. | P iX iS | Z NZ NE | 07 40 47 50 41 09.6 | 15. | iP S N, eS Z iX | Z Z E | 03 04 17.6 05 17 19 |
| 14. | iP Z, P E eS P: C | N | 08 45 17.8 46 22 | 15. | iP P: D | Z | 04 21 55.6 |
| 14. | iP P: D | Z | 09 31 56.4 | | | | 19.7 S., 178.4 W. Fiji Is. h: 646 km. H= 04 11 49.2 |
| | | | 2.4 N., 126.8 E. Molucca Passage. h: N. H= 09 25 00.5 | | | | USCGS |
| 14. | P eS | Z N | 12 29 33 30 36 | 15. | P iX eS eX | NEZ N N E | 07 20 48.8 56 22 11 17 |
| 14. | iP EZ, P N S P: W, C | NE | 13 57 21.4 40 | 15. | P S N, eS Z S | Z Z E | 12 20 14 39 40 |
| 14. | iP iX eS P: C | Z NEZ E | 14 18 24.6 37 20 48 | 15. | P Z, eP E | | 13 44 51 |
| | | | 44.1 N., 149.5 E. Kurile Is. h: 37 km. H= 14 15 40.3 | 15. | iP eS eS | NEZ E N | 14 13 46.2 14 06 07 |
| | | | USCGS | | | | P: N, E, D |
| 14. | iP S iX | NEZ NE Z | 15 57 15.0 58 14 50 | 15. | iP S P: S, E, D | NEZ NEZ | 20 30 50.4 31 19.4 |
| | | | P: S, W, C 39.8 N., 144.0 E. Off east coast of Honshu, Japan. h: 30 km. H= 15 55 47.9 | 15. | iP Z, P E iX S | N NE | 20 51 46.4 46.8 52 15 |
| | | | JMA | | | | P: D 36.1 N., 140.9 E. Near east coast of Honshu, Japan. h: 40 km. H= 20 51 09.4 |
| 14. | iP Z, P N eS P: C | E | 16 05 52.0 07 29 | 15. | iP EZ, P N S P: W, C | NE NE | 21 28 11.4 39 |
| 14. | iP S iX P: S, W, C | NEZ NE Z | 20 02 58.2 04 33 54 | 15. | iP E, P Z S P: W | NE NE | 23 43 47.6 44 05 |
| | | | 40.3 N., 144.2 E. Off east coast of Honshu, Japan. h: 40 km. H= 20 01 27.1 | | | | JMA |
| 15. | P | Z | 01 32 24 | 16. | iP S P: S, E, D | NEZ NE | 03 26 11.4 37 |
| | | | | | | | 34.8 N., 140.1 E. (cont.) |

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| Date | Phase | Comp. | Time(GMT) h m s | Date | Phase | Comp. | Time(GMT) h m s |
|--|---------------|---------------|--------------------------------|---|--------------------|----------------------|--------------------------------------|
| 17. | P eS | Z N | 17 31 04 32 23 | 18. | iP iX S L | NEZ N NZ Z | 05 28 19.6 25.6 31 24 32 10 |
| 17. | P P eL | Z N N | 17 41 28.2 28.4 18 16 28 | P: N,W,D Mag. 7.0 (Mat.) 38.3 N., 119.4 E. Northeastern China. h: N. H= 05 24 48.0 USCGS | | | |
| P: C 52.5 N., 158.6 E. Near east coast of Kamchatka. h: 65 km. H= 17 36 43.5 USCGS | | | | 18. | iP S | NEZ E | 05 43 10.2 19 |
| 17. | P eS | EZ N | 17 56 49 57 35 | P: N,E,C | | | |
| 17. | iP S S | NEZ N E | 19 03 20.6 29 29.4 | 18. | eP eP | Z Z | 05 55 38 06 04 10 |
| P: N,E,C | | | | 18. | eP | Z | 06 28 57 |
| 17. | iP S S | NEZ N E | 19 34 26.8 35.5 35.8 | 18. | P iX | Z Z | 06 43 25 29 |
| P: N,E,C | | | | 18. | eP | Z | 07 44 56 |
| 17. | eP S | Z E | 20 33 36 34 54 | 38.7 N., 119.4 E. Northeastern China. h: N. H= 07 41 20.5 USCGS | | | |
| 17. | P | Z | 21 00 38 | 64.1 N., 147.6 W. Central Alaska. h: 31 km. H= 20 51 37.5 USCGS | | | |
| 17. | eP | Z | 21 04 05 | 18. | eP eS | Z E | 09 55 24 56 17 |
| 64.0 N., 147.3 W. Central Alaska. h: 20 km. H= 20 55 04.3 USCGS | | | | 18. | eP | Z | 10 26 54 |
| 17. | eP | Z | 22 12 39 | 18. | P S | Z E | 12 10 49 11 14 |
| 17. | P | Z | 22 35 22 | 18. | iP iS S | NEZ NEZ NE | 12 46 10.8 19.4 |
| 28.9 S., 178.8 W. Kermadec Is. h: 227 km. H= 22 23 35.5 USCGS | | | | P: N,E,C | | | |
| 18. | iP iX S | EZ N NE | 04 16 26.2 26.4 22 38 | 18. | iP S | NEZ NE | 12 51 34.6 43 |
| P: E,C 6.4 S., 130.0 E. Banda Sea. h: 145 km. H= 04 08 36.4 USCGS | | | | 18. | P iX iS | Z E NE | 13 12 11 14 19.6 |
| 18. | iP S | NEZ NE | 04 46 51.0 59 | 18. | P iX S L | NEZ NE NZ Z | 13 37 22 27 40 14 26 |
| P: N,E,C | | | | (cont.) | | | |

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| Date | Phase | Comp. | Time(GMT) h m s | Date | Phase | Comp. | Time(GMT) h m s |
|------|--------|-------|--|------|---|-------|---|
| | | | 33.1 N., 119.4 E. Northeastern China. h: 32 km. H= 13 33 48.4 | | | | 17.3 S., 72.5 W. Near coast of Peru. h: 54 km. H= 04 54 54.1 |
| 18. | P | NEZ | 14 05 12 | 19. | iP | NEZ | 05 21 54.3 |
| | iC | NE | 20.2 | | P: N,W,C | | |
| 13. | PKP1 | Z | 14 33 51 | | 21.5 S., 179.5 W. Fiji Is. h: 659 km. H= 05 11 43.4 | | USCGS |
| | PKP2 | NZ | 34 05 | 19. | P | Z | 06 13 38 |
| | | | 60.5 S., 26.0 W. South Sandwich Is. h: 40 km. H= 14 13 55.4 | 19. | P | Z | 08 40 05 |
| | | | | 19. | iP | NEZ | 09 16 29.6 |
| 18. | iP | NEZ | 14 49 50.5 | | iX | E | 42 |
| | iS | NE | 58.8 | | S | NE | 17 30 |
| | | | P: N,E,C | | P: S,W,C | | |
| 18. | iP | Z | 21 00 04.6 | | 39.5 N., 143.7 E. Near east coast of Honshu, Japan. h: 30 km. H= 09 15 08.6 | | JMA |
| | P: D | | | 19. | iP | NEZ | 09 25 52.5 |
| 13. | ePKP 1 | Z | 23 37 02 | | iX | N | 26 02 |
| | PKP 2 | Z | 23 | | iX | E | 27 18 |
| | | | 18.2 S., 63.3 W. Bolivia. h: 19 km. H= 23 17 10.6 | | P: C | | |
| | | | | | 39.5 N., 143.6 E. Near east coast of Honshu, Japan. h: 50 km. H= 09 24 32.6 | | JMA |
| 19. | iP | Z | 01 36 00.6 | 19. | eP | Z | 11 00 08 |
| | S | NE | 22 | | iX | Z | 13 |
| 19. | P | Z | 01 41 33 | | eS | NE | 03 03 |
| | eX | Z | 46 55 | | | | 33.1 N., 119.3 E. Northeastern China. h: N. H= 10 56 34.0 |
| | S | E | 47 47 | | | | USCGS |
| | eX | E | 50 46 | | | | |
| | | | 6.4 S., 130.1 E. Banda Sea. h: 142 km. H= 01 33 44.0 | 19. | L | NE | 11 35 28 |
| | | | | 19. | iP E, P NZ | | 11 41 23 |
| 19. | P | EZ | 01 55 45 | | eS | N | 42 39 |
| | eS | NE | 58 40 | 19. | P | Z | 16 31 13 |
| 19. | iP | NEZ | 03 20 56.3 | | S | NEZ | 32 53 |
| | S | E | 21 02.5 | 19. | iP | NEZ | 13 08 12.8 |
| | | | P: N,E,C | | eS | N | 18 00 |
| 19. | P | Z | 04 19 03 | | L | NE | 28 25 |
| | eX | N | 22 45 | | L | Z | 31 36 |
| 19. | PKP | Z | 05 14 30 | | | | P: N,W,C |
| | iX | Z | 32.2 | | | | (cont.) |
| | iX | NE | 32.8 | | | | |
| | SS | N | 37 00 | | | | |
| | Lq | NE | 56 12 | | | | |
| | Lr | Z | 06 03 00 | | | | |
| | | | Mag. 6 $\frac{1}{2}$ -7.(Mat.) | | | | |

(cont.)

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| Date | Phase | Comp. | Time(GMT) h m s | Date | Phase | Comp. | Time(GMT) h m s |
|------|------------|---|--------------------|------|--|---|--------------------|
| | | 27.5 S., 176.6 W. Kermadec Is. h: N. H= 17 56 24.9 | USCGS | 22. | | 39.7 N., 143.8 E. Near east coast of Honshu, Japan. h: 80 km. H= 16 07 18.5 | JMA |
| 19. | P | NEZ | 18 32 11 | 20. | iP | NEZ | 16 42 45.0 |
| | S | E | 33 43 | | iX | NEZ | 43 06 |
| | P: W | | | | P: N,E,D | | |
| | | 40.9 N., 142.6 E. Near east coast of Honshu, Japan. h: 20 km. H= 18 30 44.7 | JMA | 20. | iP | NEZ | 16 43 17.6 |
| | | | | | eS | N | 44 12 |
| | | | | | P: S,W,C | | |
| 19. | eL | E | 19 29 54 | 20. | P | NZ | 17 33 21 |
| | eL | N | 31 20 | | eS | E | 34 40 |
| | | 51.4 N., 174.7 E. Near Is., Aleutian Is. h: N. H= 19 18 48.9 | USCGS | 20. | eP | Z | 20 00 54 |
| | | | | | iX | Z | 56 |
| | | | | | S | NE | 10 10 |
| | | | | | L | N | 18 10 |
| 19. | iP | NEZ | 22 15 45.3 | | 19.2 S., 176.4 W. Fiji Is. h: 20 km. H= 19 49 42.0 | | |
| | S | E | 16 08 | | USCGS | | |
| | P: N,W,C | | | 20. | iP Z, P NE | | 20 14 26.3 |
| | | 35.6 N., 140.1 E. Honshu, Japan. h: 80 km. H= 22 15 13.1 | JMA | | iX | NE | 27.1 |
| | | | | | P: D | | |
| 20. | iP Z, P NE | | 00 12 40.0 | | 15.6 S., 167.8 E. New Hebrides Is. h: 196 km. H= 20 04 46.7 | | |
| | eS | N | 14 18 | | USCGS | | |
| | P: C | | | 20. | P | Z | 21 59 03 |
| 20. | P E, P Z | | 01 07 46.5 | 20. | eP | Z | 22 33 16 |
| | S | N | 08 25 | | S | N | 53 |
| | P: E | | | 20. | P | EZ | 23 58 03 |
| | | 42.4 N., 145.0 E. Near east coast of Honshu, Japan. h: 20 km. H= 02 10 45.1 | JMA | | iX | NEZ | 08 |
| | | | | | eX | E | 00 01 44 |
| | | | | | eX | N | 50 |
| 20. | ePKP | Z | 12 33 36 | 20. | P | Z | 00 13 22 |
| | | 60.0 S., 65.3 W. Drake Passage. h: N. H= 12 13 43.4 | USCGS | 21. | eP | Z | 02 33 17 |
| | | | | | eX | N | 50 32 |
| | | | | | eX | E | 46 |
| 20. | iP | NEZ | 15 57 22.5 | 21. | eP | Z | 04 00 43 |
| | iS | E | 43.4 | 21. | eP | Z | 07 12 22 |
| | P: S,W,C | | | | eS | N | 21 50 |
| | | 16 08 41.4 | | | eS | E | 22 12 |
| 20. | iP | NEZ | 16 08 41.4 | | eL | N | 30 26 |
| | eS | N | 09 36 | | eL | E | 30 |
| | iX | E | 44 | | eL | Z | 34 20 |
| | P: S,W,C | | | | (cont.) | | |

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| Date | Phase | Comp. | Time(GMT) h m s | Date | Phase | Comp. | Time(GMT) h m s |
|------|-------|-------|--------------------|------|-------------------|-------|--------------------|
| | | | | 22. | P NZ, eP E | | 01 07 52 |
| | | | | | X Z | | 08 00 |
| | | | | | X E | | 29 |
| | | | | 22. | P Z | | 01 42 39 |
| | | | | | iX N, X E | | 43.0 |
| | | | | | iX Z | | 44.3 |
| | | | | | X N | | 43 10 |
| | | | | | S NZ | | 16 |
| | | | | 22. | eP NEZ | | 02 46 06 |
| | | | | | S NE | | 48 |
| | | | | | X Z | | 47 20 |
| | | | | 22. | P Z | | 06 08 23 |
| | | | | | X E | | 25 |
| | | | | | X NZ | | 26 |
| | | | | 22. | iP Z | | 06 10 49.3 |
| | | | | | X NE | | 56 |
| | | | | | iX Z | | 11 13.4 |
| | | | | | X NE | | 24 |
| | | | | | X E | | 12 30 |
| | | | | | X Z | | 40 |
| | | | | | X N | | 13 26 |
| | | | | 22. | P Z, eP NE | | 07 44 50 |
| | | | | | iX N, X EZ | | 52 |
| | | | | | S NEZ | | 45 14 |
| | | | | | X N | | 52 |
| | | | | 22. | P NZ | | 08 48 47 |
| | | | | | X NEZ | | 54 |
| | | | | | X N | | 50 32 |
| | | | | | X E | | 36 |
| | | | | | X Z | | 42 |
| | | | | 22. | P Z, eP NE | | 11 02 48 |
| | | | | | 18.3 S., 177.7 W. | | |
| | | | | | Fiji Is. | | |
| | | | | | h: 576 km. | | |
| | | | | | H= 10 52 40.8 | | |
| | | | | 22. | P NEZ | | 12 54 05 |
| | | | | | X NZ | | 55 13 |
| | | | | | X Z | | 46 |
| | | | | 22. | P EZ, eP N | | 13 59 57 |
| | | | | | S E | | 14 09 18 |
| | | | | | S N | | 20 |
| | | | | | L E | | 18 30 |
| | | | | | L N | | 32 |
| | | | | | Lr1 NZ | | 21 16 |
| | | | | | L E | | 32 |
| | | | | | 18.1 S., 172.5 W. | | |
| | | | | | Tonga Is. | | |
| | | | | | h: 30 km. | | |
| | | | | | H= 13 48 36.5 | | |
| | | | | 21. | eP Z | | 22 31 05 |
| | | | | | eX EZ | | 29 |
| | | | | | eX N | | 30 |

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| Date | Phase | Comp. | Time(GMT) h m s | Date | Phase | Comp. | Time(GMT) h m s |
|------|----------------------------|-------|--------------------|------|-------------------|-------|--------------------|
| | X | NE | 11 27 24 | 24. | P | Z | 02 02 57 |
| | X | N | 32 | | X | Z | 03 03 |
| | P: E,D | | | | | | |
| 23. | iP | NEZ | 13 15 19.0 | 24. | P | Z | 03 18 49 |
| | X | NZ | 26 | | X | N | 58 |
| | S | NE | 50 | | eL | E | 40 46 |
| | X | Z | 17 08 | 24. | eP | Z | 03 42 30 |
| | X | N | 17 | | eL | Z | 04 04 30 |
| | X | E | 18 12 | | L | EZ | 05 40 |
| | P: N,E,D | | | | | | |
| | 27.3 N., 141.5 E. | | | 24. | iP | NZ | 05 10 27.4 |
| | Near east coast of Honshu, | | | | X | E | 49 |
| | Japan. | | | | X | NZ | 50 |
| | h: 53 km. | | | | eS | NE | 16 02 |
| | H= 13 14 35.1 | | | | X | Z | 33 |
| | USCGS | | | | Lq1 | E | 18 28 |
| | | | | | eScS | NZ | 20 50 |
| 23. | P EZ, eP N | | 14 29 26 | | 1.6 N., 126.5 E. | | |
| | S | N | 51 | | Molucca Passage. | | |
| | X | N | 30 05 | | h: 41 km. | | |
| | X | E | 16 | | H= 05 03 26.7 | | |
| | USCGS | | | | | | |
| 23. | eP | Z | 15 05 26 | 24. | iP | Z | 06 22 33.2 |
| | S? | N | 06 10 | | S | N | 59 |
| | X | Z | 25 | | | | |
| | X | E | 28 | 24. | eP | Z | 06 39 57 |
| 23. | P NZ, eP E | | 16 13 13 | | X | Z | 40 10 |
| | S | NEZ | 37 | | L? | N | 43 20 |
| 23. | iP | NZ | 16 29 06.4 | 24. | ePKP1 | Z | 13 00 38 |
| | S | NEZ | 30 22.7 | | eX | E | 02 00 |
| | P: N,C | | | | eX | Z | 08 |
| | 30.5 N., 137.6 E. | | | | eX | N | 03 10 |
| | South of Honshu, Japan. | | | | eX | E | 09 20 |
| | h: 487 km. | | | | L | N | 18 52 |
| | H= 16 27 29.4 | | | | L | E | 19 00 |
| | USCGS | | | | L | Z | 20 |
| | | | | | 45.4 S., 35.0 W. | | |
| | P | NEZ | 20 13 02 | | Prince Edward Is. | | |
| | X | Z | 34 | | h: N. | | |
| | eX | NZ | 36 | | H= 12 41 40.2 | | |
| | X | N | 41 | | USCGS | | |
| | X | E | 44 | 24. | iP | NEZ | 14 58 30.0 |
| 24. | eP | Z | 00 27 12 | | eS | NE | 15 00 12 |
| | eS | E | 28 35 | | P: S,W,C | | |
| 24. | P | NEZ | 01 29 16 | | 41.7 N., 142.5 E. | | |
| | X | Z | 28 | | Hokkaido, Japan. | | |
| | eX | N | 29 | | h: 70 km. | | |
| | X | Z | 38 | | H= 14 56 57.7 | | |
| | X | N | 43 | | USCGS | | |
| | X | N | 30 00 | 24. | P | Z | 15 18 25 |
| | X | Z | 08 | | 1.8 S., 128.5 E. | | |
| | eS | NE | 32 28 | | Halmahera. | | |
| | 45.6 N., 152.1 E. | | | | h: 53 km. | | |
| | Kurile Is. | | | | H= 15 11 01.1 | | |
| | h: 30 km. | | | | USCGS | | |
| | H= 01 25 01.0 | | | | USCGS | | |

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| Date | Phase | Comp. | Time(GMT) h m s | Date | Phase | Comp. | Time(GMT) h m s |
|------|--|---|---|------|---|----------------------------------|---|
| 24. | P X S L | Z Z N NE | 16 23 17 35 26 56 29 20 | 25. | P iX | Z Z | 09 12 13 13 00.0 |
| | | | 49.5 N., 155.7 E. Kurile Is. h: N. H= 16 19 07.4 | | | | 53.7 N., 161.9 E. Off east coast of Kamchatka. h: N. H= 09 07 03.2 |
| 24. | iP iS | NEZ N | 16 33 58.9 34 26.5 | 25. | P iX X | Z Z Z | 10 25 35 45.0 52 32 40 |
| | | | P: N, E, D | | | | |
| 24. | P | Z | 23 33 50 | 25. | P X S X | Z Z N Z | 11 49 13 30 51 12 34 |
| 25. | iP Z, P N iX X X S | Z E N NEZ | 01 01 48.9 53.8 55.0 02 01 03 26 | 25. | P eS L L L Lr | Z NE Z E N Z | 13 02 03 07 38 10 50 11 32 34 14 20 |
| | | | 28.2 N., 139.3 E. Bonin Is. h: 462 km. H= 00 59 47.7 | | | | Mag. 6 $\frac{1}{2}$ (Gol.) 53.3 N., 167.0 W. Fox Is. h: 42 km. H= 12 54 27.6 |
| 25. | iP NZ, P E S | NEZ | 02 47 05.5 18 | 25. | P X S L L L | Z Z E N E Z | 13 41 03 14 46 34 49 00 14 20 |
| | | | P: C | | | | 2.6 N., 126.6 E. Molucca Passage. h: N. H= 13 34 09.8 |
| 25. | iP eL | Z N | 04 44 50.6 53 34 | 25. | P S | NZ N | 20 32 07 33 19 |
| | | | 0.2 S., 125.1 E. Molucca Sea. h: 82 km. H= 04 37 35.9 | | | | |
| 25. | P | Z | 06 24 50 | 25. | P Z, eP N X eS iX L L L | Z Z EZ Z N Z Z | 22 55 23 57 38 23 00 06 25 02 18 03 10 30 |
| 25. | PKP1 iX PKP2 PKP2 pPKP2 pPPP pPPP eSS eX | Z Z Z NE Z N EZ N E | 06 25 34 54 26 16 17 28 19 35 47 49 48 35 49 12 | 25. | P eS eL eL | NEZ N N Z | 09 04 24 09 30 16 08 19 30 |
| | | | 25.6 S., 63.3 W. Salta Province, Argentina. h: 579 km. H= 06 06 42.4 | | | | 21.6 N., 111.9 E. Eastern China. h: N. H= 22 49 41.3 |
| 25. | P eS eL eL | Z N N Z | 09 04 24 09 30 16 08 19 30 | 25. | P | NEZ | 23 04 12 |
| | | | | | | | 53.8 N., 160.4 E. Near east coast of Kamchatka. (cont.) |

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| Date | Phase | Comp. | Time(GMT) h m s | Date | Phase | Comp. | Time(GMT) h m s |
|------|---------------|-------|--------------------|------|------------|-------|----------------------------|
| | h: N. | | | 26. | P NZ, eP E | | 19 38 36 |
| | H= 22 59 08.3 | | USCGS | | X NZ | | 49 |
| | | | | | S NEZ | | 40 43 |
| 26. | iP | NEZ | 00 22 36.8 | 27. | P Z, eP NE | | 00 57 29 |
| | iS | NEZ | 23 03.4 | | iX N | | 48.9 |
| | P: N,E,C | | | | eS N | | 59 05 |
| 26. | eP | Z | 05 31 59 | 27. | P Z | Z | 02 24 47 |
| | eX | NE | 33 12 | | pP N | | 25 06 |
| | eX | Z | 35 10 | | pP Z | | 08 |
| 26. | eX | Z | 08 56 04 | | S N | | 33 10 |
| 26. | iP | NEZ | 14 39 39.8 | | | | 19.4 S., 168.8 E. |
| | S | EZ | 40 00 | | | | New Hebrides Is. |
| | iX | N | 07 | | | | h: 70 km. |
| | P: N,W,C | | | | | | H= 02 14 28.1 USCGS |
| | | | | 27. | P Z | | 08 59 41 |
| | | | | | | | 17.6 S., 178.3 W. |
| | | | | | | | Fiji Is. |
| | | | | | | | h: 552 km. |
| | | | | | | | H= 08 49 37.6 USCGS |
| 26. | P | NEZ | 14 48 16 | 27. | P NZ, eP E | | 11 03 56 |
| | S | NEZ | 38 | | eX Z | | 05 34 |
| | | | | | eX E | | 38 |
| 26. | iP Z, P NE | | 14 55 11.0 | | | | 40.9 N., 142.3 E. |
| | X Z | | 40 | | | | Near east coast of Honshu, |
| | X E | | 15 10 32 | | | | Japan. |
| | eL E | | 12 06 | | | | h: 43 km. |
| | P: D | | | | | | H= 11 02 27.8 USCGS |
| | | | | 27. | iP | NEZ | 16 44 00.5 |
| | | | | | S | NEZ | 25 |
| | | | | | P: S,W,C | | |
| | | | | 27. | P Z | | 19 35 41 |
| 26. | P NZ, eP E | | 15 39 47 | | X Z | | 52 |
| | eL N | | 49 55 | | | | 57.6 N., 153.6 W. |
| | eL E | | 51 36 | | | | Kodiak Is. |
| | eL Z | | 38 | | | | h: 51 km. |
| | | | | | | | H= 19 27 03.9 USCGS |
| | | | | 27. | P NZ, eP E | | 21 30 53 |
| | | | | | S NE | | 33 28 |
| | | | | | ScS Z | | 40 35 |
| | | | | | Lq1 E | | 43 36 |
| | | | | | | | 59.4 N., 145.3 W. |
| | | | | | | | Gulf of Alaska. |
| | | | | | | | h: N. |
| | | | | | | | H= 21 21 40.6 USCGS |
| 26. | P | NZ | 18 41 53 | 27. | eP | Z | 22 30 54 |
| | X | E | 56 | | X | E | 31 01 |
| | eL | N | 57 45 | | X | N | 03 |
| | eL | E | 58 06 | | X | N | 43 |
| | eL | Z | 19 00 00 | | S? | NEZ | 34 08 |
| | | | | | eL | Z | 35 50 |

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| Date | Phase | Comp. | Time(GMT) h m s | Date | Phase | Comp. | Time(GMT) h m s |
|------|--|-------------------|---|------|---|-------|---|
| | | | 24.9 N., 122.5 E. Taiwan. h: 105 km. H= 22 26 54.2 USCGS | 28. | iP Z, P N iS N P: D | | 22 14 44.2 59.2 |
| 28. | P iX Z, X N X | Z E | 06 38 34 46.0 56 | 29. | iP Z, P NE iX Z eS NE eL E eL N L Z P: C | | 02 02 59.1 05 03.8 09 00 11 34 12 05 13 56 |
| | | | 57.5 N., 153.9 W. Kodiak Is. h: 23 km. H= 06 29 53.9 USCGS | | | | 3.4 S., 144.3 E. Near north coast of New Guinea. h: 6 km. H= 01 55 20.4 USCGS |
| 28. | P eS | Z NE | 06 45 57 46 40 | 29. | iP NEZ iS NE P: S, E, D | | 03 23 41.8 24 16 |
| 28. | P X | Z N | 07 28 04 48 | 29. | iP NZ, P E X NE X Z X NEZ P: N, C | | 06 34 02.9 32 33 53 |
| 28. | P S | Z E | 10 20 54 22 16 | | | | 14.8 S., 167.2 E. New Hebrides Is. h: 124 km. H= 06 24 21.6 USCGS |
| | | | 43.1 N., 141.8 E. Hokkaido, Japan. h: 56 km. H= 10 19 10.0 USCGS | 29. | iP NZ, P NE S NE P: D | | 13 15 18.0 39 |
| 28. | iP NZ, P E X NE P: S, D | | 11 40 48.9 41 45 | 29. | P NEZ X Z eS NEZ S E | | 16 49 06 16 51 48 52 |
| 28. | P X S | NZ NZ NEZ | 13 05 08 18 06 40 | 29. | iP NZ, P E S NE X E X N P: N, D | | 19 16 59.8 17 14 18 03 10 |
| | | | 30.7 N., 132.5 E. Southeast of Shikoku, Japan. h: 24 km. H= 13 03 17.6 USCGS | 29. | P NEZ X Z eS NEZ S E | | 22 45 43 48 46 21 |
| 28. | iP Z, P NE X E X N X Z S E iX N, X E X Z X N X E P: C | | 15 41 00.5 25 26 30 43 18 23 45 12 25 30 | 30. | eP NEZ X NEZ S NE L E L N L Z Lq Z X N | | 03 27 05 11 29 41 30 05 33 34 31 16 48 46 |
| | | | 24.1 N., 142.7 E. Volucano Is. h: N. H= 15 31 56.2 USCGS | | | | (cont.) |
| 28. | P iX S | NEZ NEZ NEZ | 16 27 16 18 26 | | | | |
| 28. | P S | NZ N | 21 23 46 29 11 | | | | |

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| Date | Phase | Comp. | Time(GMT) h m s | Date | Phase | Comp. | Time(GMT) h m s |
|------|----------------------------------|---|---|------|--|---------------------------------------|---|
| | | 22.4 N., 142.8 E. Volcano Is. h: 20 km. H= 03 23 37.6 | USCGS | 31. | iP Z, P N X Z eS NE L Z L NE | | 02 42 14.4 43 40 48 16 50 25 46 |
| 30. | iP X X S L L L | NEZ EZ NE NE E N Z | 04 20 52.8 21 07 13 22 30 50 52 23 16 | 31. | eP S L L | Z N E NZ | 03 53 22 59 28 09 02 40 05 54 |
| | | P: N, W, C 28.5 N., 142.6 E. Bonin Is. h: N. H= 04 18 44.5 | USCGS | 31. | eP eX PcP eS L L L | Z Z Z NE N Z E Z | 11 30 26 31 20 32 42 36 26 39 30 41 42 41 14 |
| 30. | eL eL | E N | 10 20 30 36 | | | | |
| | | 53.0 N., 170.2 W. Fox Is. h: 35 km. H= 10 04 03.0 | USCGS | 30. | P X X | NEZ E N | 12 49 18 50 45 48 |
| 30. | P X X | NEZ E N | 12 49 18 50 45 48 | 31. | P eX eS | NEZ N N | 18 44 34 52 46 40 |
| | | 42.7 N., 144.2 E. Hokkaido, Japan. h: 33 km. H= 12 47 24.5 | USCGS | 30. | P S | NEZ NE | 15 13 02 19 |
| 30. | iP Z, P NE eS eS X | N E Z | 17 15 19.7 19 42 48 20 24 | 31. | P NZ, eP E X N X E | | 18 58 58 59 17 21 |
| | | P: D 55.5 N., 164.0 E. Komandorsky Is. h: N. H= 17 09 50.3 | USCGS | 31. | iP Z, P N X Z X E | | 20 29 50.8 30 05 07 |
| 30. | iP NZ, P E X S | Z N | 18 42 50.7 43 17 29 | 31. | P X Z X E X N eS N | NZ | 21 16 35 37.0 56 17 30 |
| | | P: S, D 33.1 N., 140.2 E. South of Honshu, Japan. h: 87 km. H= 18 41 53.8 | USCGS | | | | |
| 31. | eP | Z | 01 07 08 | | | | |

Mineo Takehana

Director

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| Date | Phase | Comp. | Time(GMT) h m s | Date | Phase | Comp. | Time(GMT) h m s |
|------|------------|-------|---------------------------------|------|-------|-------|--------------------|
| | eX | NE | 06 10 20 | 3. | P | NEZ | 01 01 00 |
| | | | 45.2 N., 150.9 E. | | iX | N | 02 25 |
| | | | Kurile Is. | | | | |
| | | | h: N. | 3. | eP | NEZ | 04 23 43 |
| | | | H= 06 04 08.5 | | eS | NEZ | 27 00 |
| | | | USCGS | | eX | NE | 28 12 |
| 2. | P | NEZ | 10 20 56 | | eX | Z | 29 32 |
| | iX | Z | 21 10 | | | | |
| | eS | N | 23 35 | | | | |
| | eX | Z | 40 | | | | |
| | | | 45.3 N., 151.0 E. | | | | |
| | | | Kurile Is. | | | | |
| | | | h: 38 km. | 3. | P | NEZ | 07 51 22 |
| | | | H= 10 17 54.1 | | iX | Z | 40 |
| | | | USCGS | | eS | N | 54 10 |
| 2. | P | NZ | 10 28 57 | | eX | NEZ | 30 |
| | S | NEZ | 29 19 | | eL | E | 56 30 |
| | | | | | | | |
| 2. | iP | NEZ | 17 44 49.4 | | | | |
| | eL | E | 51 00 | | | | |
| | eL | N | 14 | | | | |
| | | | P: E,C | | | | |
| | | | 56.2 N., 162.4 E. | 3. | P | Z | 11 05 39 |
| | | | Near east coast of Kamchatka. | | | | |
| | | | h: N. | | | | |
| | | | H= 17 39 21.9 | | | | |
| | | | USCGS | | | | |
| 2. | iP | NZ | 20 10 19.5 | | | | |
| | S | N | 46 | 3. | iP | EZ | 11 27 54.0 |
| | | | P: D | | iX | EZ | 28 18 |
| | | | | | | | |
| 2. | eP | NZ | 20 20 22 | | | | |
| | S | NE | 26 20 | 3. | P | NEZ | 23 53 00 |
| | iX | Z | 44 | | | | |
| | L | E | 29 15 | 4. | eP | NEZ | 00 12 52 |
| | L | N | 26 | | | | |
| | L | Z | 30 | 4. | P | NEZ | 00 27 31 |
| | L | N | 32 00 | | | | |
| | | | 2.6 S., 126.6 E. | 4. | P | NZ | 10 30 04 |
| | | | Ceram Sea. | | eS | E | 35 28 |
| | | | h: 28 km. | | eX | N | 40 |
| | | | H= 20 12 44.4 | | eL | N | 37 20 |
| | | | USCGS | | eL | E | 40 |
| 3. | iP Z, P NE | | 00 30 24.0 | | | | |
| | iX | Z | 26 | | | | |
| | PP | Z | 32 00 | | | | |
| | S | N | 36 30 | | | | |
| | eL | NE | 40 00 | | | | |
| | eL | E | 41 40 | 4. | P | NZ | 14 13 53 |
| | eL | N | 42 40 | | | | |
| | | | P: C | | | | |
| | | | Mag. 5 $\frac{1}{2}$ - 6 (Mat.) | | | | |
| | | | 4.2 S., 153.0 E. | | | | |
| | | | New Ireland region. | | | | |
| | | | h: 65 km. | | | | |
| | | | H= 00 22 32.0 | | | | |
| | | | USCGS | 4. | P | Z | 15 33 33 |
| 3. | eP | Z | 00 32 14 | | S | NZ | 53 |
| | iX | EZ | 33 00 | | | | |

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| Date | Phase | Comp. | Time(GMT) h m s | Date | Phase | Comp. | Time(GMT) h m s |
|------|--|--------------------------------|--|------|--|---|---|
| 4. | iP S | NEZ NEZ | 17 26 19.0 26 | 5. | iP Z, P E P: C | | 09 27 25.2 |
| | P: N, W | | | | 1.3 N., 126.3 E. Molucca Passage. h: N. H= 09 20 18.8 USCGS | | |
| 4. | iP PP iX iS ScS iX | NEZ Z N NE NE Z | 17 26 39.5 28 15 28 32 28.0 35 38 38 00 | 5. | P iX PP S eX L | Z N Z NE NEZ Z | 13 10 30 12 00 20 16 08 18 30 22 00 |
| | P: N, E, C 5.7 S., 125.3 E. Banda Sea. h: 521 km. H= 17 19 19.6 USCGS | | | | 1.3 N., 126.4 E. Molucca Passage. h: 18 km. H= 13 03 23.3 USCGS | | |
| 4. | PKP 1 PKP 2 | Z Z | 22 10 00 19 | 5. | iP S iX | NZ N E | 13 53 16.0 54 14 15 |
| | 26.9 S., 70.9 W. Near coast of northern Chile. h: N. H= 21 50 02.3 USCGS | | | | P: S, C 32.1 N., 138.3 E. South of Honshu, Japan. h: 357 km. H= 13 52 00.9 USCGS | | |
| 5. | iP Z, P N P: D | | 00 55 32.6 | 5. | P iX eX S L L L L | Z NE Z NE NE E N Z | 16 40 28 30 42 00 46 50 50 10 51 12 53 12 26 |
| | P: N, C Mag. 6 $\frac{1}{2}$ - 6 $\frac{1}{2}$ (Mat.) 1.3 N., 126.2 E. Molucca Passage. h: 34 km. H= 02 13 09.6 USCGS | | | | Mag. 6 $\frac{1}{2}$ (Mat.) 5.2 S., 153.8 E. New Ireland region. h: 69 km. H= 16 32 25.8 USCGS | | |
| 5. | eP | Z | 02 50 48 | 5. | iP Z, P NE iX | | 17 54 28.9 40 |
| | P: C 1.2 N., 126.3 E. Molucca Passage. h: 47 km. H= 03 20 52.4 USCGS | | | | P: C 20.6 S., 169.4 E. New Hebrides Is. h: 66 km. H= 17 44 01.1 USCGS | | |
| 5. | P eS eL | Z E NEZ | 06 58 38 07 04 32 07 00 | 5. | P S | NEZ NEZ | 18 20 01 21 16 |
| | 1.3 N., 126.3 E. Molucca Passage. h: 37 km. H= 06 51 32.8 USCGS | | | | 29.9 N., 140.8 E. South of Honshu, Japan. h: 124 km. H= 18 18 19.6 USCGS | | |
| 5. | iP | NEZ | 18 35 10.7 | 5. | iP | NEZ | 18 35 10.7 |
| | (cont.) | | | | (cont.) | | |

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| Date | Phase | Comp. | Time(GMT) h m s | Date | Phase | Comp. | Time(GMT) h m s |
|------|----------------------------|-------|--------------------|------|-------------------------------|-------|--------------------|
| | S | NEZ | 18 35 36 | 7. | P | Z | 01 57 31 |
| | P: S, W, C | | | | sP | Z | 58 08 |
| | 37.5 N., 140.6 E. | | | | S | E | 02 03 46 |
| | Honshu, Japan. | | | | ScS or SS | N | 07 00 |
| | h: 130 km. | | | | ScS or SS | EZ | 08 |
| | H= 18 34 33.3 | | | | iX | N | 10 12 |
| | USCGS | | | | 5.3 S., 154.1 E. | | |
| 5. | iP | EZ | 20 50 13.2 | | Solomon Is. | | |
| | P: W, D | | | | h: 116 km. | | |
| | H= 01 49 33.2 | | | | USCGS | | |
| 5. | P | NEZ | 21 35 41 | 7. | P | NEZ | 04 32 20 |
| | 1.2 N., 126.3 E. | | | | iX | E | 33 07 |
| | Molucca Passage. | | | | iX | NZ | 08 |
| | h: 18 km. | | | | | | |
| | H= 21 28 31.9 | | | | USCGS | | |
| 6. | P | NEZ | 08 41 40 | 7. | P | NZ | 05 37 37 |
| | iX | NEZ | 42.0 | 7. | iP | NEZ | 06 50 52.8 |
| | S | NEZ | 42 33 | | eS | Z | 54 50 |
| | 32.5 N., 140.6 E. | | | | eL | Z | 57 00 |
| | South of Honshu, Japan. | | | | P: S, W, C | | |
| | h: 67 km. | | | | 52.2 N., 158.9 E. | | |
| | H= 08 40 32.2 | | | | Near east coast of Kamchatka. | | |
| | USCGS | | | | h: 69 km. | | |
| 6. | P | EZ | 08 52 01 | | H= 06 46 08.3 | | |
| | iX | NEZ | 02.8 | 7. | P | Z | 09 43 20 |
| | S | NZ | 53 | | 20.6 S., 178.6 W. | | |
| | 32.5 N., 140.6 E. | | | | Fiji Is. region. | | |
| | South of Honshu, Japan. | | | | h: 630 km. | | |
| | h: 67 km. | | | | H= 09 33 09.1 | | |
| | H= 08 50 53.3 | | | | USCGS | | |
| 6. | iP | NEZ | 10 22 14.4 | 7. | iP | Z | 11 54 25.5 |
| | iX | E | 46 | | iX | Z | 35 |
| | iX | N | 52 | | eX | N | 56 05 |
| | P: N, E, D | | | | P: C | | |
| | 37.6 N., 141.1 E. | | | 7. | P | EZ | 14 08 23 |
| | Near east coast of Honshu, | | | 7. | P | Z | 15 34 41 |
| | Japan. | | | | eX | E | 36 47 |
| | h: 80 km. | | | | 45.2 N., 148.3 E. | | |
| | H= 10 21 33.7 | | | | Kurile Is. | | |
| | JMA | | | | h: 152 km. | | |
| 6. | P | EZ | 11 34 02 | | H= 15 32 02.5 | | |
| | S | N | 43 | | USCGS | | |
| 6. | P | Z | 13 02 43 | 7. | P | Z | 17 21 17 |
| | S | N | 03 16 | 8. | eP | EZ | 02 24 20 |
| 6. | eP | Z | 16 01 19 | | eS | E | 51 |
| | 10.8 N., 43.2 W. | | | 8. | iP | NEZ | 05 31 43.3 |
| | North Atlantic ridge. | | | | S | NEZ | 50 |
| | h: N. | | | | P: S, E, C | | |
| | H= 15 41 50.4 | | | | USCGS | | |
| 6. | iP Z, P NE | | 16 59 17.9 | 8. | P | NEZ | 06 39 55 |
| | iX | NE | 17 00 16 | | iX | Z | 40 38 |
| | P: C | | | | pPP | Z | 42 35 |
| | | | | | (cont.) | | |

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| Date | Phase | Comp. | Time(GMT) h m s | Date | Phase | Comp. | Time(GMT) h m s |
|------|--|-------|--------------------|------|----------------------|-------|--------------------|
| | S | NE | 06 47 10 | | Mag. 6 (Pas.) | | |
| | sS | NE | 48 28 | | 6.1S., 129.7 E. | | |
| | iX | Z | 40 | | Banda Sea. | | |
| | eX | E | 51 00 | | h: 196 km. | | |
| | eX | N | 52 00 | | H= 20 44 21.0 USC GS | | |
| | 36.4 N., 70.9 E. Hindu Kush region. h: 198 km. H= 06 30 57.1 USC GS | | | 9. | eP | Z | 01 21 20 |
| | | | | | 1.3 N., 126.0 E. | | |
| | | | | | Molucca Passage. | | |
| | | | | | h: N. | | |
| | | | | | H= 01 14 16.3 USC GS | | |
| 8. | iP | NZ | 09 50 06.6 | 9. | iP Z, P NE | | 05 27 49.8 |
| | eX | N | 51 09 | | P: D | | |
| | P: S, D | | | | 19.8 S., 178.0 W. | | |
| 8. | ePKP | Z | 11 28 11 | | Fiji Is. region. | | |
| | eX | Z | 40 | | h: 571 km. | | |
| | PP | Z | 32 42 | | H= 05 17 36.8 USC GS | | |
| | SK SP | Z | 42 20 | 9. | P | NEZ | 10 57 07.6 |
| | iX | E | 45 16 | | S | N | 38 |
| | iX | Z | 52 | 9. | P | Z | 13 51 45 |
| | eSS | E | 52 00 | | eS | N | 14 01 17 |
| | eSS | N | 04 | | eX | E | 28 |
| | eSSS | NE | 58 00 | | eSS | E | 06 10 |
| | eX | N | 12 14 40 | | eL | N | 16 56 |
| | eL | EZ | 22 40 | | eL | Z | 17 00 |
| | eL | N | 23 30 | | eL | E | 30 |
| | Mag. 6½ (Mat.) | | | | 4.6 N., 62.5 E. | | |
| | 47.7 S., 15.8 W. | | | | Carlsberg ridge. | | |
| | South Atlantic ridge. | | | | h: N. | | |
| | h: N. | | | | H= 13 40 01.0 USC GS | | |
| | H= 11 08 14.8 USC GS | | | 8. | iP | EZ | 12 53 26.0 |
| | | | | | S | NE | 41 |
| | | | | | P: E, D | | |
| | | | | 9. | eP | NZ | 16 38 03 |
| | | | | | 42.4 N., 19.4 E. | | |
| | | | | | Yugoslavia. | | |
| | | | | | h: 25 km. | | |
| | | | | | H= 16 25 35.2 USC GS | | |
| | | | | 9. | eP | Z | 18 26 44 |
| | | | | | eX | Z | 27 52 |
| | | | | 9. | P | Z | 21 57 23 |
| | | | | | eX | N | 46 |
| | | | | 10. | PKP | Z | 02 59 01 |
| | | | | | iX | Z | 21 |
| | | | | | 15.6 S., 74.1 W. | | |
| | | | | | Near coast of Peru. | | |
| | | | | | h: 83 km. | | |
| | | | | | H= 02 39 33.9 USC GS | | |
| | | | | 10. | P | EZ | 03 03 26 |
| | | | | | eS | E | 48 |
| | | | | 10. | P | Z | 16 55 34 |
| | | | | | eX | NE | 57 |

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| Date | Phase | Comp. | Time(GMT) h m s | Date | Phase | Comp. | Time(GMT) h m s |
|------|------------|--|--------------------|------|---------|---------|--------------------|
| 12. | | Kurile Is. h: N. H= 23 02 53.8 | USCGS | 12. | P eS | NZ N | 02 09 04 10 47 |
| 11. | P | N Mag. 6.2 (Mat.) 1.7 N., 126.5 E. Molucca Passage. h: 34 km. H= 23 52 56.9 | USCGS | 12. | P | Z | 02 21 55 |
| 12. | P | Z | 00 05 38 | 12. | P | Z | 02 21 55 |
| 12. | P | NEZ 1.8 N., 126.2 E. Molucca Passage. h: 54 km. H= 00 47 30.3 | USCGS | 12. | iP | NEZ | 02 28 50.0 |
| 12. | iP Z, P NE | P: D 43.4 N., 147.3 E. Kurile Is. h: 30 km. H= 00 53 36.0 | USCGS | 12. | P | Z | 02 33 42 |
| 12. | P | Z 43.5 N., 147.2 E. Kurile Is. h: N. H= 01 03 07.3 | USCGS | 12. | iP | Z | 02 35 41.0 |
| 12. | P | NZ eS 44.0 N., 143.1 E. Kurile Is. h: N. H= 01 12 24.7 | USCGS | 12. | iP | Z | 02 36 59.5 |
| 12. | P | Z S 43.0 N., 147.7 E. Kurile Is. h: N. H= 01 28 22.0 | USCGS | 12. | P | Z | 02 36 59.5 |
| 12. | P | Z 43.6 N., 147.5 E. Kurile Is. h: N. H= 01 34 57.4 | USCGS | 12. | P | Z | 02 39 25 |
| 12. | P | NEZ S 44.0 N., 144.7 E. Kurile Is. h: 34 km. H= 01 44 54 46 56 | USCGS | 12. | P | Z | 02 39 25 |
| 12. | P | Z | 02 04 09 | 12. | iP | Z | 02 55 18.5 |
| | | | | 12. | iX | Z | 51 |
| | | | | 12. | P | Z | 03 01 53 |
| | | | | 12. | P | Z | 03 08.00 |

| Date | Phase | Comp. | Time(GMT) h m s | Date | Phase | Comp. | Time(GMT) h m s |
|------|------------|--|--------------------|------|-------|-------|--------------------|
| 11. | P | NZ NE 19.9 N., 147.3 W. Kurile Is. h: 10 km. H= 20 46 41.6 | USCGS | 11. | P | NZ | 17 52 02 |
| 11. | P | N Mag. 6.2 (Mat.) 1.7 N., 126.5 E. Molucca Passage. h: 34 km. H= 23 52 56.9 | USCGS | 11. | P | NZ | 17 52 02 |
| 11. | P | Z | 00 05 38 | 11. | P | NZ | 17 52 02 |
| 11. | P | NEZ 1.8 N., 126.2 E. Molucca Passage. h: 54 km. H= 00 47 30.3 | USCGS | 11. | P | NZ | 17 52 02 |
| 11. | iP Z, P NE | P: D 43.4 N., 147.3 E. Kurile Is. h: 30 km. H= 00 53 36.0 | USCGS | 11. | P | NZ | 17 52 02 |
| 11. | P | Z 43.5 N., 147.2 E. Kurile Is. h: N. H= 01 03 07.3 | USCGS | 11. | P | NZ | 17 52 02 |
| 11. | P | NZ eS 44.0 N., 143.1 E. Kurile Is. h: N. H= 01 12 24.7 | USCGS | 11. | P | NZ | 17 52 02 |
| 11. | P | Z S 43.0 N., 147.7 E. Kurile Is. h: N. H= 01 28 22.0 | USCGS | 11. | P | NZ | 17 52 02 |
| 11. | P | Z 43.6 N., 147.5 E. Kurile Is. h: N. H= 01 34 57.4 | USCGS | 11. | P | NZ | 17 52 02 |
| 11. | P | NEZ S 44.0 N., 144.7 E. Kurile Is. h: 34 km. H= 01 44 54 46 56 | USCGS | 11. | P | NZ | 17 52 02 |
| 11. | P | Z | 02 04 09 | 11. | P | NZ | 17 52 02 |

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| Date | Phase | Comp. | Time(GMT) h m s | Date | Phase | Comp. | Time(GMT) h m s |
|------|---------------|--------------|--|------|--------------|-----------------|--|
| 12. | P iX eS | Z NE N | 03 11 39 40.0 13 12 | 12. | P | Z | 04 31 35 |
| | | | 44.6 N., 148.5 E. Kurile Is. h: N. H= 03 09 08.7 | | | | 43.8 N., 147.9 E. Kurile Is. h: N. H= 04 29 08.7 |
| 12. | iP S | Z E | 03 21 15.2 23 15 | 12. | P S | Z E | 04 50 45 52 29 |
| | | | P: C 44.7 N., 148.2 E. Kurile Is. h: N. H= 03 18 45.7 | | | | P: C 43.0 N., 147.8 E. Kurile Is. h: N. H= 04 48 25.1 |
| 12. | P | Z | 03 32 51 | 12. | P eS | Z E | 04 55 56.5 57 53 |
| | | | 43.6 N., 148.1 E. Kurile Is. region. h: N. H= 03 30 22.5 | | | | P: N, E, D 43.3 N., 147.5 E. Kurile Is. h: N. H= 04 53 36.5 |
| 12. | P iX eS | Z NZ N | 03 35 56 58.4 37 38 | 12. | iP S L | NEZ E NEZ | 05 05 53.3 07 42 08 33 |
| | | | 43.1 N., 147.6 E. Kurile Is. h: N. H= 03 33 37.2 | | | | P: S, W, C Mag. 6.2 (Mat.) 43.6 N., 148.0 E. Kurile Is. region. h: N. H= 05 03 26.9 |
| 12. | eP | NZ | 03 51 39 | 12. | P | NEZ | 05 11 15 |
| | | | 43.6 N., 148.1 E. Kurile Is. region. h: N. H= 03 49 09.6 | | | | 43.2 N., 147.0 E. Kurile Is. h: N. H= 05 08 59.0 |
| 12. | eP | Z | 03 58 19 | 12. | P | Z | 05 49 35 |
| | | | | | | | 43.2 N., 147.2 E. Kurile Is. h: N. H= 05 47 16.9 |
| 12. | iP S | Z N | 04 00 50.2 02 40 | 12. | P | Z | 05 55 56 |
| | | | P: C 43.1 N., 148.7 E. Kurile Is. h: N. H= 03 58 19.9 | | | | eS E 57 40 |
| 12. | P S | Z E | 04 15 07 16 53 | 12. | P eL | NEZ E | 05 58 10 |
| | | | 43.3 N., 146.7 E. Kurile Is. h: 86 km. H= 04 12 52.2 | | | | 43.7 N., 148.5 E. Kurile Is. region. h: N. H= 05 53 28.2 |
| 12. | iP | NZ | 04 29 14.5 | 12. | P | Z | 06 02 37 |
| | | | P: S, C 43.6 N., 147.7 E. Kurile Is. h: 66 km. H= 04 26 55.0 | | | | 43.2 N., 147.3 E. Kurile Is. h: N. H= 06 00 16.4 |

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| Date | Phase | Comp. | Time(GMT) h m s | Date | Phase | Comp. | Time(GMT) h m s |
|------|------------|-------|-------------------------------|------|-------|-------|---------------------|
| 12. | P | Z | 06 33 06 | | | | |
| | | | 42.8 N., 146.3 E. | | | | h: 62 km. |
| | | | Off coast of Hokkaido, Japan. | | | | H= 07 54 51.0 USCGS |
| | | | h: 13 km. | 12. | P | Z | 08 04 26 |
| | | | H= 06 30 53.6 USCGS | 12. | eP | Z | 08 05 29 |
| 12. | iP NE, P Z | | 06 41 09.0 | 12. | P | NZ | 08 07 31 |
| | S N | | 42 57 | | | | 43.8 N., 148.5 E. |
| | | | P: S, W | | | | Kurile Is. region. |
| | | | 43.1 N., 147.5 E. | | | | h: 50 km. |
| | | | Kurile Is. | | | | H= 08 04 58.5 USCGS |
| | | | h: N. | 12. | iP | NZ | 08 44 23.0 |
| | | | H= 06 38 49.0 USCGS | | S | NE | 46 19 |
| 12. | iP | NZ | 06 45 15.3 | | | | P: S, C |
| | | | P: N, D | | | | 43.7 N., 148.4 E. |
| | | | 43.1 N., 147.0 E. | | | | Kurile Is. region. |
| | | | Kurile Is. | | | | h: 33 km. |
| | | | h: N. | | | | H= 08 41 50.0 USCGS |
| | | | H= 06 42 55.5 USCGS | 12. | eP | Z | 09 18 12 |
| 12. | P | NEZ | 06 51 43 | | eX | Z | 19 03 |
| | S | NE | 53 25 | 12. | P | Z | 09 19 52 |
| | | | 42.9 N., 146.7 E. | | | | |
| | | | Off coast of Hokkaido, Japan. | 12. | P | NZ | 09 23 28 |
| | | | h: N. | | eS | E | 25 13 |
| | | | H= 06 49 30.3 USCGS | | | | 43.1 N., 147.3 E. |
| 12. | iP | NZ | 07 06 08.0 | | | | Kurile Is. |
| | S | E | 07 55 | | | | h: 32 km. |
| | | | P: S, C | | | | H= 09 21 07.8 USCGS |
| | | | 43.2 N., 147.6 E. | 12. | P | NEZ | 09 27 58 |
| | | | Kurile Is. | | S | E | 29 59 |
| | | | h: N. | | | | P: S, W, C |
| | | | H= 07 03 45.2 USCGS | | | | 43.1 N., 147.6 E. |
| 12. | iP | NEZ | 07 13 10.3 | | | | Kurile Is. |
| | S | E | 15 06 | | | | h: N. |
| | | | P: N, E, D | | | | H= 09 25 38.7 USCGS |
| | | | 43.7 N., 147.9 E. | 12. | iP | NZ | 09 36 04.6 |
| | | | Kurile Is. | | S | N | 37 48 |
| | | | h: N. | | | | P: N, D |
| | | | H= 07 10 41.4 USCGS | | | | 43.6 N., 147.5 E. |
| 12. | iP | NZ | 07 31 15.0 | | | | Kurile Is. |
| | | | P: S, C | | | | h: 34 km. |
| | | | | | | | H= 09 33 43.2 USCGS |
| 12. | P | Z | 07 40 40 | 12. | P | NZ | 09 54 04 |
| | eS | E | 42 25 | | iX | Z | 15.6 |
| | | | 43.9 N., 147.7 E. | | eS | N | 55 58 |
| | | | Kurile Is. | | | | 43.5 N., 147.3 E. |
| | | | h: N. | | | | Kurile Is. |
| | | | H= 07 38 10.7 USCGS | | | | h: N. |
| 12. | P | NEZ | 07 56 59 | | | | H= 09 51 43.2 USCGS |
| | iX | E | 57 20.0 | | | | |
| | | | 42.6 N., 146.6 E. | | | | |
| | | | Off coast of Honshu, Japan. | | | | |
| | | | (cont.) | | | | |

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| Date | Phase | Comp. | Time(GMT) h m s | Date | Phase | Comp. | Time(GMT) h m s |
|------|-------------------|-----------------------|------------------------------------|------|----------|----------|--|
| 12. | P iX | Z N | 09 56 54 55.5 | | | | |
| | | | | | | | Kurile Is. region. h: N. H= 11 53 49.6 USCGS |
| | | | | | | | |
| | | | | 12. | iP S | NZ E | 11 59 24.3 12 01 16 |
| | | | | | | | P: S, C 43.9 N., 147.7 E. Kurile Is. h: N. H= 11 56 54.9 USCGS |
| 12. | iP P: C | Z | 10 14 46.5 | | | | |
| | | | | 12. | P S | Z E | 12 05 30 07 17 |
| | | | | | | | 42.9 N., 147.3 E. Off coast of Hokkaido, Japan. h: 39 km. H= 12 03 13.5 USCGS |
| 12. | P eS | NEZ E | 10 25 01 26 46 | | | | |
| | | | | 12. | P | Z | 12 09 23 |
| | | | | | | | |
| 12. | P eS | Z N | 10 42 11 44 00 | 12. | iP | NEZ | 12 28 20.7 |
| | | | | | | | P: S, W, D Mag. 6 $\frac{1}{2}$ -6 $\frac{1}{2}$ (Mat.) 1.7 N., 126.3 E. Molucca Passage. h: 30 km. H= 12 21 19.0 USCGS |
| 12. | eP | Z | 10 50 06 | 12. | eP S | NEZ E | 12 34 02 35 51 |
| | | | | | | | 42.9 N., 147.8 E. Off coast of Hokkaido, Japan. h: 40 km. H= 12 31 48.2 USCGS |
| 12. | P eX | Z Z | 11 13 36 14 07 | | | | |
| | | | | 12. | iP S | NEZ N | 12 46 59.5 48 41 |
| | | | | | | | P: S, W, C 43.2 N., 147.5 E. Kurile Is. h: N. H= 12 44 37.4 USCGS |
| 12. | iP S L L | NEZ NEZ NE Z | 11 23 55.0 25 55 26 35 55 | | | | |
| | | | | 12. | iPZ, PNE | | 13 02 38.5 |
| | | | | | | | P: D 1.7 N., 126.2 E. Molucca Passage. h: 67 km. H= 12 55 40.5 USCGS |
| | | | | | | | |
| | | | | 12. | P | Z | 13 04 44 |
| | | | | | | | |
| | | | | 12. | P | Z | 13 14 52 |
| | | | | | | | 43.4 N., 148.0 E. Kurile Is. region. h: N. H= 13 12 26.0 USCGS |
| 12. | P | Z | 11 40 36 | | | | |
| | | | | | | | |
| | | | | | | | |
| 12. | P | Z | 11 51 04 | | | | |
| | | | | | | | |
| | | | | | | | |
| 12. | P | Z | 11 54 37 | | | | |
| | | | | | | | |
| | | | | | | | |
| 12. | P | Z | 11 56 29 | | | | |
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| Date | Phase | Comp. | Time(GMT) h m s | Date | Phase | Comp. | Time(GMT) h m s |
|------|-------------------|-------|--------------------|------|-------------------------------|-------|--------------------|
| | | | | 12. | P | NEZ | 21 58 53 |
| | | | | | iX | NZ | 56.4 |
| | | | | | eS | E | 22 00 40 |
| | | | | | P: N, D | | |
| | | | | | 43.3 N., 147.4 E. | | |
| | | | | | Kurile Is. | | |
| | | | | | h: 14 km. | | |
| | | | | | H= 21 56 31.4 | | USCGS |
| 12. | eP | Z | 17 52 37 | 12. | P | NEZ | 22 27 02 |
| | S | NE | 53 | | iX | Z | 13 |
| 12. | iP | NEZ | 17 55 48.6 | | 51.5 N., 159.6 E. | | |
| | S | NEZ | 56 04 | | Off east coast of Kamchatka. | | |
| | P: S, E, D | | | | h: N. | | |
| 12. | iP | NEZ | 18 20 45.6 | | H= 22 22 16.5 | | USCGS |
| | S | NEZ | 21 01 | | P: N, D | | |
| | P: S, E, D | | | | 43.3 N., 147.7 E. | | |
| | | | | | Kurile Is. | | |
| | | | | | h: N. | | |
| | | | | | H= 23 05 57.1 | | USCGS |
| | | | | 12. | iP NZ, PE | | 23 08 21.2 |
| | | | | | S | N | 10 15 |
| | | | | | P: N, D | | |
| | | | | | 43.3 N., 147.7 E. | | |
| | | | | | Kurile Is. | | |
| | | | | | h: N. | | |
| | | | | | H= 23 05 57.1 | | USCGS |
| 12. | P | Z | 18 24 45 | 12. | P | Z | 23 18 14 |
| 12. | P | NZ | 18 35 53 | | iX | NEZ | 25.0 |
| 12. | iP Z, PNE | | 18 45 14.6 | | S | NE | 20 04 |
| | iS | NEZ | 29.6 | | 43.3 N., 147.8 E. | | |
| | P: C | | | | Kurile Is. | | |
| | h: N. | | | | H= 23 15 48.9 | | USCGS |
| 12. | P | Z | 18 52 07 | 12. | P | Z | 23 43 00 |
| 12. | iP | EZ | 18 58 09.5 | | 43.2 N., 147.4 E. | | |
| | iS | NEZ | 24.8 | | Kurile Is. | | |
| | P: E, D | | | | h: N. | | |
| | H= 23 40 37.8 | | | | USCGS | | |
| 12. | P | NEZ | 19 22 52 | 12. | P | Z | 23 51 48 |
| | 43.0 N., 146.7 E. | | | | eS | E | 53 43 |
| | Kurile Is. | | | | 44.3 N., 147.1 E. | | |
| | h: 25 km. | | | | Kurile Is. | | |
| | H= 19 20 38.3 | | USCGS | | h: N. | | |
| | H= 23 49 31.8 | | | | USCGS | | |
| 12. | iP NZ PE | | 19 58 50.5 | 12. | P | NZ | 23 55 04 |
| | iX | NEZ | 59 11 | | iX | N | 13.5 |
| | P: S, C | | | | S | E | 56 46 |
| 12. | P | Z | 20 21 03 | | 42.7 N., 147.0 E. | | |
| | iX | Z | 14 | | Off coast of Hokkaido, Japan. | | |
| | 43.1 N., 147.6 E. | | | | h: N. | | |
| | Kurile Is. | | | | H= 23 52 56.9 | | USCGS |
| | h: N. | | | | USCGS | | |
| | H= 20 18 40.9 | | USCGS | 12. | iP | NEZ | 21 18 23.3 |
| | H= 21 16 11.3 | | USCGS | | S | E | 20 06 |
| | USCGS | | | | P: S, W, C | | |
| | USCGS | | | | 42.9 N., 146.5 E. | | |
| | USCGS | | | | Off coast of Hokkaido, Japan. | | |
| | USCGS | | | | h: N. | | |
| | USCGS | | | | H= 00 18 33.5 | | USCGS |
| | USCGS | | | 13. | P | Z | 00 20 48 |
| | USCGS | | | | eS | E | 22 33 |
| | USCGS | | | | 42.9 N., 147.4 E. | | |
| | USCGS | | | | Off coast of Hokkaido, Japan. | | |
| | USCGS | | | | h: 57 km. | | |
| | USCGS | | | | H= 00 18 33.5 | | USCGS |

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|------|------------------------|-----------------|--------------------------------|------|-----------------------------|---------------|--|
| 13. | iP eS P: S, D | NZ E | 01 39 50.4 41 41 | 13. | | | 43.1 N., 147.1 E. Kurile Is. h: N. H= 03 50 54.4 USCGS |
| 13. | P S | Z E | 02 00 14 02 06 | 13. | P Z | | 04 15 03 42.5 N., 146.9 E. Off coast of Hokkaido, Japan. h: N. H= 04 12 52.0 USCGS |
| 13. | iP eS P: C | NZ E | 02 09 41.5 11 38 | 13. | iP NZ, PE eS P: C | | 04 30 45.8 32 47 43.5 N., 148.0 E. Kurile Is. region. h: N. H= 04 28 18.0 USCGS |
| 13. | iP eS P: C | Z E | 02 09 41.5 11 38 | 13. | eP eS | Z E | 05 27 54 29 38 |
| 13. | iP Z, PNE P: D | | 02 30 40.7 | 13. | P S | Z N | 05 57 22 59 12 43.9 N., 147.7 E. Kurile Is. h: 34 km. H= 05 54 53.1 USCGS |
| 13. | eP P: S, E, D | Z NEZ NEZ | 02 34 16 03 03 42.0 57.5 | 13. | P eS | Z N | 06 07 36 09 30 |
| 13. | iP iS P: S, E, D | NEZ NEZ | 03 03 42.0 57.5 | 13. | P eS | NZ E | 06 12 51 14 40 43.8 N., 147.7 E. Kurile Is. h: 63 km. H= 06 10 27.3 USCGS |
| 13. | P | Z | 03 15 39 | 13. | P | Z | 06 39 03 |
| 13. | iP eS P: N, E, D | NEZ E | 03 31 35.7 33 25 | 13. | iP P: D | Z | 07 24 19.6 |
| 13. | iP S P: S, W, C | NEZ E | 03 49 49.4 51 48 | 13. | P iX S P: C | NEZ Z E | 07 26 20 21.7 43.1 N., 147.0 E. Kurile Is. h: N. H= 07 24 05.1 USCGS |
| 13. | iP P: C | Z | 03 53 11.6 | 13. | iP Z, PN iX S P: C | Z E | 08 34 01.0 01.9 35 57 44.0 N., 147.7 E. Kurile Is. h: N. H= 08 31 32.2 USCGS |

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| Date | Phase | Comp. | Time(GMT) | Date | Phase | Comp. | Time(GMT) |
|------|--|-------|------------|------|---|-------|------------|
| | | | h m s | | | | h m s |
| 13. | iP | NEZ | 23 15 32.5 | 14. | P | NEZ | 05 12 13 |
| | P: S, W, C 43.9 N., 148.5 E. Kurile Is. region. h: 40 km. H= 23 12 57.9 USCGS | | | | 43.2 N., 147.4 E. Kurile Is. h: N. H= 05 09 51.4 USCGS | | |
| 14. | iP | NEZ | 00 14 48.2 | 14. | P | Z | 05 44 00 |
| | P: N, W, D 42.9 N., 147.2 E. Off coast of Hokkaido, Japan. h: N. H= 00 12 31.5 USCGS | | | | eS N 45 56 43.2 N., 147.8 E. Kurile Is. h: N. H= 05 41 29.1 USCGS | | |
| 14. | P | Z | 00 20 16 | 14. | eP | Z | 06 09 15 |
| | S N 22 51 22.6 N., 141.9 E. Volcano Is. region. h: 228 km. H= 00 17 01.7 USCGS | | | | eX N 11 14 43.6 N., 149.0 E. Kurile Is. region. h: N. H= 06 06 39.9 USCGS | | |
| 14. | iP Z, PN | | 00 36 34.3 | 14. | P | Z | 09 02 10 |
| | P: C 1.6 N., 126.3 E. Md ucca Passage. h: N. H= 00 29 32.3 USCGS | | | | iX Z 10.6 eS Z 04 07 43.1 N., 147.9 E. Kurile Is. h: 50 km. H= 08 59 47.5 JMA | | |
| 14. | eP | Z | 01 49 56 | 14. | P | Z | 11 06 06 |
| | eS N 51 52 43.6 N., 148.6 E. Kurile Is. region. h: N. H= 01 47 25.9 USCGS | | | | S NE 12 40 L N 19 00 L E 20 00 5.4 S., 152.0 E. New Britain region. h: N. H= 10 58 01.7 USCGS | | |
| 14. | P | Z | 02 31 46 | 14. | P | EZ | 11 53 32 |
| | eX N 32 47 | | | | eS E 55 19 43.0 N., 147.6 E. Kurile Is. h: 60 km. H= 11 51 12.0 JMA | | |
| 14. | iP Z, PNE | | 03 09 49.8 | 14. | eP | Z | 12 18 00 |
| | eS E 11 33 P: D 43.2 N., 147.7 E. Kurile Is. h: 50 km. H= 03 07 29.9 JMA | | | | S E 20 42 43.4 N., 148.2 E. Kurile Is. region. h: N. H= 12 16 14.6 USCGS | | |
| 14. | eP | Z | 03 40 16 | 14. | iP | Z | 12 40 44.5 |
| | 43.8 N., 148.0 E. Kurile Is. region. h: N. H= 03 37 45.6 USCGS | | | | S N 41 11 P: S, E, D 34.8 N., 140.1 E. Off east coast of Honshu, Japan. h: 70 km. H= 12 40 08.2 JMA | | |
| 14. | P | NEZ | 04 50 15 | | | | |
| | iX NEZ 15.8 S N 52 04 43.1 N., 148.1 E. Kurile Is. h: 50 km. H= 04 47 49.0 JMA | | | | | | |

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| Date | Phase | Comp. | Time(GMT) h m s | Date | Phase | Comp. | Time(GMT) h m s |
|------|--------------|----------------|---|------|------------------------------|------------------------|--|
| 14. | P eS | Z N | 18 54 13 56 03 | 15. | P iX eS | Z Z E | 00 55 16 17.0 57 03 |
| 14. | P S | Z NE | 19 52 59 53 22 | 15. | P S | NEZ N | 01 03 55 05 06 |
| 14. | iP S | NEZ E | 20 18 01.8 19 49 | 15. | iP Z, PN eS iX P: C | N N NZ | 01 09 35.8 11 23 36.6 |
| | | | 43.1 N., 147.7 E. Off coast of Hokkaido, Japan. h: 60 km. H= 20 15 40.5 JMA | | | | 43.1 N., 147.4 E. Kurile Is. h: N. H= 01 07 15.8 USCGS |
| 14. | P eS | Z N | 21 13 25 15 20 | 15. | P eS | Z N | 02 59 31 03 00 05 |
| | | | 43.5 N., 143.1 E. Kurile Is. region. h: N. H= 21 10 56.2 USCGS | | | | |
| 14. | P | Z | 21 15 27 | 15. | P PP S L L | Z Z NE E N | 03 45 29 47 36 51 32 54 20 54 40 |
| 14. | eP | Z | 21 57 59 | | | | 3.5 S., 144.4 E. Near North coast of New Guinea. h: 22 km. H= 03 37 52.8 USCGS |
| | | | 40.6 N., 142.5 E. Off east coast of Honshu, Japan. h: 60 km. H= 21 56 35.3 JMA | | | | |
| 14. | P eS | NEZ E | 22 14 57 16 56 | 15. | P eS | Z N | 04 21 57 23 55 |
| | | | 43.3 N., 143.8 E. Kurile Is. region. h: 50 km. H= 22 12 23.8 JMA | | | | |
| 14. | P eS | NEZ E | 22 59 41 23 01 22 | 15. | P eS | Z N | 04 40 30 42 15 |
| | | | 52.2 N., 160.5 E. Off east coast of Kamchatka. h: N. H= 23 48 36.0 USCGS | | | | |
| 15. | iP iS | NEZ N | 00 38 00.6 17.4 | 15. | eP S | Z N | 04 42 52 44 34 |
| | | | P: N, W, C 35.8 N., 139.5 E. South-east of Honshu, Japan. h: 90 km. H= 00 37 36.2 JMA | 15. | P | Z | 05 24 19 |
| 15. | P S iX | NEZ NE Z | 00 40 34 42 19 27 | 15. | iP S | NEZ NE | 06 19 21.8 48 |
| | | | | | | | P: S, E, D |
| | | | | 15. | iP iX | Z N | 06 20 59.0 21 30.0 |
| | | | | | | | 43.2 N., 148.5 E. Kurile Is. h: 60 km. H= 06 18 29.8 JMA |

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| Date | Phase | Comp. | Time(GMT) h m s | Date | Phase | Comp. | Time(GMT) h m s |
|------|---------------|-------------------|-----------------------------|------|-----------|----------|--|
| 15. | P S | Z N | 07 24 20 26 17 | 15. | P | Z | 12 44 00 |
| | | | | 15. | eP eS | Z N | 12 45 44 47 47 |
| | | | | 15. | P S | NE E | 14 12 16 14 04 |
| | | | | | | | 43.3 N., 147.5 E. Kurile Is. h: 25 km. H= 14 09 53.1 USCGS |
| 15. | iP iX S | NEZ NEZ NEZ | 08 45 16.0 17.5 48 00 | 15. | P S | NEZ N | 15 25 00 51 |
| | | | | | | | 38.7 N., 142.3 E. Off east coast of Honshu, Japan. h: 40 km. H= 14 23 59.3 JMA |
| | | | | 15. | P S | NEZ N | 16 26 43 27 27 |
| | | | | 15. | P S | NEZ E | 16 58 41 17 00 36 |
| | | | | | | | 43.1 N., 147.7 E. Kurile Is. h: N. H= 16 56 18.8 USCGS |
| 15. | P eS | Z Z | 09 18 42 20 22 | 15. | P S | NZ N | 17 03 08 04 22 |
| | | | | | | | 43.7 N., 147.8 E. Kurile Is. h: 147 km. H= 17 01 02.7 USCGS |
| 15. | iP S | NEZ NEZ | 09 48 22.1 40 | 15. | P S | Z Z | 17 56 41 19 10 34 |
| | | | | | | | P: D |
| | | | | 15. | iP Z, PNE | | 19 14 39.0 |
| | | | | | | | 23.5 S., 180.0 W. South of Fiji Is. h: 518 km. H= 19 04 09.5 USCGS |
| 15. | P S | NEZ E | 10 04 41 06 30 | 15. | P S | NEZ N | 20 08 39 10 28 |
| | | | | | | | 43.3 N., 147.9 E. Kurile Is. h: 50 km. H= 20 06 17.2 JMA |
| | | | | 15. | P S | Z E | 20 17 31 50 |
| | | | | | | | i X N 51.8 |
| 15. | P S | NEZ E | 10 13 47 15 35 | 15. | P S | Z N | 11 49 33 34 06 |
| | | | | | | | 42.9 N., 148.4 E. Kurile Is. h: 50 km. H= 11 29 47.5 JMA |
| 15. | P iX eS | Z NZ N | 10 36 22 29.5 38 17 | 15. | eP | Z | 11 49 33 |
| | | | | | | | 43.2 N., 147.3 E. Kurile Is. h: N. H= 11 47 35.6 USCGS |
| 15. | P | NZ | 10 57 20 | | | | |

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| Date | Phase | Comp. | Time(GMT) h m s | Date | Phase | Comp. | Time(GMT) h m s | |
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| 15. | iP Z, PNE S E | | 20 50 04.3 51 45 | 16. | | 43.0 N., 147.7 E. Kurile Is. h: 40 km. H= 03 28 03.2 | JMA | |
| | P: D | | | 16. | iP S | NEZ N | 03 40 02.8 21 | |
| | | | | | P: S, E, D | | | |
| 15. | eP | Z | 20 55 44 | | | 36.0 N., 140.0 E. South-east of Honshu, Japan. h: 50 km. H= 03 39 37.1 | JMA | |
| | | | | | | | | |
| | | | | | | | | |
| 15. | iP iX S | Z E E | 22 46 04.6 05.3 47 48 | 16. | iP iS | EZ NE | 05 35 42.7 58.0 | |
| | P: N, D | | | 16. | P | Z | 06 17 57 | |
| | | | | 16. | eP iX | Z Z | 06 27 43 55 | |
| | | | | 16. | P eX eX | Z N N | 08 41 37 42 12 43 36 | |
| 15. | P | NEZ | 22 59 34 | 16. | iP iX eS L | NEZ E NE E | 08 50 07.5 09.2 51 55 52 30 | |
| | | | | | P: N, E, D | | | |
| | | | | | | 42.9 N., 147.6 E. Kurile Is. h: 60 km. H= 08 47 47.6 | JMA | |
| 15. | eP | Z | 23 15 40 | 16. | P S L | NEZ N NE | 09 05 45 07 42 08 20 | |
| 15. | P eS | Z N | 23 38 13 40 03 | | P: S, W, C | | | |
| 16. | iP eS | NEZ NE | 01 18 47 22 40 | | | 43.6 N., 148.4 E. Kurile Is. region. h: 60 km. H= 09 03 14.7 | JMA | |
| | P: S, E, D | | | 16. | iP eS | Z N | 10 05 16.2 07 16 | |
| | | | | | P: C | | | |
| | | | | | | 43.9 N., 147.7 E. Kurile Is. h: 61 km. H= 10 02 57.3 | USCGS | |
| 16. | eP eX | Z Z | 01 22 29 43 | 16. | P iX iX | Z Z Z | 11 51 18 29 38 | |
| 16. | P eX | Z E | 01 29 35 31 35 | 16. | P iX | Z Z | 12 11 16 13 25 | |
| | | | | 16. | P | Z | 12 44 43 | |
| | | | | | | | | |
| | | | | | | | | |
| 16. | P | NEZ | 02 45 32 | | | | | |
| 16. | eP eX | Z N | 03 17 00 48 | | | | | |
| 16. | iP Z, PNE eS eL | E E NE | 03 30 24.7 32 13 30 | | | | | |
| | P: C | | | | | | | |

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| Date | Phase | Comp. | Time(GMT) h m s | Date | Phase | Comp. | Time(GMT) h m s |
|------|---------------|-----------------|---|------|----------------|-------------|--|
| 16. | P eS | NEZ E | 12 46 38 48 37 | 16. | P S | Z E | 18 51 56 52 12 |
| | | | 44.0 N., 148.2 E. Kurile Is. h: 45 km. H= 12 44 07.8 | 16. | P | Z | 18 53 20 |
| | | | USCGS | 16. | eP | Z | 18 54 49 |
| 16. | P eS | NEZ N | 13 14 58 16 46 | | | | 40.2 N., 142.1 E. Off east coast of Honshu, Japan. h: 30 km. H= 18 52 55.3 |
| | | | 42.9 N., 147.6 E. Kurile Is. h: 50 km. H= 13 12 38.4 | | | | JMA |
| | | | JMA | 16. | P | Z | 20 27 12 |
| 16. | P | Z | 15 13 37 | 16. | iP S | EZ E | 21 05 35.2 55 |
| 16. | iP S L | NEZ NE E | 15 17 48.8 19 36 43 | | | | P: W, C 35.5 N., 139.6 E. South-east of Honshu, Japan. h: 90 km. H= 21 05 07.0 |
| | | | P: N, E, D 42.9 N., 147.4 E. Kurile Is. h: 60 km. H= 15 15 31.1 | | | | JMA |
| | | | JMA | 16. | eP eS | Z E | 21 36 42 38 25 |
| 16. | iP S | NEZ E | 16 11 44.6 56 | 16. | P | NEZ | 22 23 14 |
| | | | P: S, E, D 36.6 N., 139.3 E. Central Honshu, Japan. h: 20 km. H= 16 11 26.5 | 16. | eP eS | Z Z | 23 27 47 29 46 |
| | | | JMA | 17. | eP | Z | 01 40 26 |
| 16. | iP S L | NEZ E NEZ | 17 16 01.0 17 50 18 20 | 17. | eP S | Z NE | 01 43 37 44 21 |
| | | | P: N, E, D 42.9 N., 147.6 E. Kurile Is. h: 60 km. H= 17 13 41.6 | 17. | P eS | NEZ E | 05 54 38 56 21 |
| | | | JMA | | | | 43.1 N., 147.3 E. Kurile Is. h: 10 km. H= 05 52 18.9 |
| 16. | iP iS | EZ EZ | 18 34 19.2 41.3 | 17. | eP iX iX | Z Z Z | 07 40 08 22 34 |
| | | | P: W, C 35.2 N., 139.4 E. South coast of Honshu, Japan. h: 120 km. H= 18 33 48.6 | | | | JMA |
| | | | JMA | 17. | iP S | NEZ N | 08 05 45.9 06 12 |
| 16. | P iX iX | Z Z Z | 18 47 41 53 48 21 | | | | P: S, E, D 34.8 N., 140.2 E. South-east of Honshu, Japan. h: 80 km. H= 08 05 06.4 |
| | | | 22.7 S., 68.5 W. Northern Cuile. h: 102 km. H= 18 27 53.7 | | | | JMA |
| | | | USCGS | 17. | P iX | Z Z | 08 33 02 28 |
| | | | | | | | 54.2 N., 164.3 W. Unimak Is. region. h: 50 km. H= 08 25 08.1 |
| | | | | | | | USCGS |

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| Date | Phase | Comp. | Time(GMT) h m s | Date | Phase | Comp. | Time(GMT) h m s |
|------|--|-------|--------------------|------|---|-------|--|
| | SSS | E | 01 46 14 | 18. | P | NEZ | 10 52 05 |
| | SSS | N | 20 | | eS | N | 53 57 |
| | L | N | 52 44 | | | | 43.6 N., 147.9 E. |
| | G | NE | 55 00 | | | | Kurile Is. h: N. H= 10 49 44.1 USCGS |
| | Mag. 6½ (Mat) 56.0 S., 123.4 W. Easter Is. cordillera. h: N. H= 01 04 04.7 USCGS | | | 18. | iP | NEZ | 11 46 00.9 |
| 18. | P | NZ | 02 24 35 | | S | N | 47 58 |
| 18. | P | Z | 03 35 02 | | P: S, W, C 43.5 N., 148.1 E. Kurile Is. region. h: 60 km. H= 11 43 34.7 JMA | | |
| | 24.9 N., 109.0 W. Gulf of California. h: 22 km. H= 03 21 54.0 USCGS | | | 18. | P | NZ | 12 07 31 |
| 18. | P | Z | 03 50 31 | | eS | N | 09 36 |
| | S | N | 41 | 18. | P | NZ | 13 49 43 |
| 13. | eP | Z | 04 08 03 | | eS | N | 51 37 |
| | 24.8 N., 109.1 W. Gulf of California. h: N. H= 03 54 49.8 USCGS | | | | 42.9 N., 147.0 E. Kurile Is. h: 0 km. H= 13 47 25.9 JMA | | |
| 18. | P | NZ | 05 26 37.2 | 18. | P | NEZ | 14 21 36 |
| | iX | NE | 38.8 | | iX | N | 22 09.5 |
| | S | N | 27 16 | | 29.1 S., 177.6 W. Kermadec Is. region. h: 60 km. H= 14 09 45.9 USCGS | | |
| | 34.0 N., 140.8 E. h: 60 km. H= 05 25 46.9 JMA | | | 18. | P | Z | 15 07 53 |
| 18. | P | Z | 05 39 06 | | 29.9 N., 67.5 E. West Pakistan. h: 15 km. H= 14 57 57.1 USCGS | | |
| 18. | iP Z, PN | | 06 34 56.8 | 18. | P | NEZ | 15 18 07 |
| | iX | N | 59.9 | | S | NE | 37 |
| | S | N | 35 34 | 18. | P | NZ | 16 32 04 |
| | P: D | | | | 44.5 N., 148.1 E. Kurile Is. h: N. H= 16 29 34.0 USCGS | | |
| 18. | P | NEZ | 06 53 47 | 18. | P | NEZ | 18 31 55 |
| | S | E | 55 43 | | eX | E | 33 54 |
| | 44.0 N., 148.3 E. Kurile Is. h: 60 km. H= 06 51 19.2 USCGS | | | | 44.0 N., 148.4 E. Kurile Is. h: 50 km. H= 18 29 27.6 USCGS | | |
| 8. | iP | Z | 07 47 20.4 | 18. | P | NEZ | 18 45 18 |
| | S | NE | 53 | | eS | E | 47 05 |
| | P: C | | | 18. | P | NEZ | 20 39 24 |
| 8. | eP | Z | 09 29 47 | | iX | N | 44 |
| | 41.8 N., 144.3 E. Hokkaido, Japan. h: 0 km. H= 09 28 02.8 JMA | | | | | | |
| 8. | iP | NZ | 10 14 09.2 | | | | |
| | iS | NE | 26.1 | | | | |
| | P: N, C | | | | | | |

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| Date | Phase | Comp. | Time(GMT) h m s | Date | Phase | Comp. | Time(GMT) h m s |
|------|---------------------------------|----------------------------|--|------|--------------------------|-------------------------------|---|
| 18. | iP eS P: N, D | NZ N | 21 31 29.4 33 32 | 19. | P eS | NEZ N | 07 13 08 14 46 |
| 18. | iP P: C | Z | 22 08 19.5 | 19. | iP P: S, E, D | NEZ | 08 04 18.8 |
| 18. | eP S | Z N | 23 25 00 41 | | | | 20.4 S., 177.8 W. Fiji Is. region. h: 549 km. H= 07 53 59.3 USCGS |
| 18. | iP eS P: N, E, D | NEZ E | 23 29 58.8 31 43 | 19. | iP S P: S, W, C | NEZ E | 08 16 48.8 17 25 |
| 19. | iP Z, P NE P: D | | 01 15 42.5 | | | | 36.2 N., 142.2 E. Off east coast of Honshu, Japan. h: 50 km. H= 08 15 58.2 JMA |
| | | | 21.8 S., 179.7 W. Fiji Is. region. h: 649 km. H= 01 05 29.9 USCGS | 19. | P | Z | 08 35 39 |
| 19. | P PcP PPP iX S L | Z N N Z N N | 01 48 17 49 29 51 40 53 25 55 50 02 01 40 | 19. | iP iX iX S L | Z NEZ E NE E N | 08 52 20.5 21.4 31.4 54 14 56 44 53 |
| | | | 6.1 S., 105.3 E. Sunda Strait. h: 50 km. H= 01 39 08.3 USCGS | | | | P: C Mag. 6.0 (Mat.) 43.3 N., 148.3 E. Kurile Is region. h: 80 km. H= 08 49 53.2 JMA |
| 19. | P S | Z NE | 02 12 12 37 | 19. | P eS | Z N | 09 07 55 09 49 |
| 19. | eP iX | Z N | 02 21 35 22 15 | 19. | iP NZ, P E S | E E | 09 32 40.0 34 34 |
| | | | 10.4 S., 161.5 E. Solomon Is. h: 70 km. H= 02 12 48.5 USCGS | | | | P: N, D 43.3 N., 148.0 E. Kurile Is. region. h: 60 km. H= 09 30 14.5 JMA |
| 19. | P | Z | 02 25 54 | 19. | P | NEZ | 10 21 15 |
| 19. | iP EZ, P N iS P: E, C | N N | 03 46 47.6 54.8 | | | | 43.8 N., 148.1 E. Kurile Is. region. h: 45 km. H= 10 18 50.7 USCGS |
| 19. | iP eS P: N, E | NE N | 03 54 53.7 55 06 | 19. | iP Z, P NE eS P: C | N N | 12 09 33.0 11 33 |
| 19. | eP | Z | 03 59 17 | | | | 44.1 N., 148.8 E. Kurile Is. h: 43 km. H= 12 06 59.6 USCGS |
| 19. | iP iS P: N, E, D | NEZ N | 04 01 40.4 02 00.3 | | | | |
| 19. | P eS | NZ N | 07 06 10 43 | | | | |

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| Date | Phase | Comp. | Time(GMT) h m s | Date | Phase | Comp. | Time(GMT) h m s |
|------|--|-------------|----------------------|------|--|---------------|-----------------------------|
| 19. | iP Z, P S | NE NE | 12 16 59.3 17 45 | 20. | P iX | Z Z | 06 41 47 57 |
| | P: D 37.7 N., 141.9 E. Off east coast of Honshu, Japan. h: 30 km. H= 12 16 09.3 JMA | | | 20. | P S | Z NE | 07 46 59 47 23 |
| 19. | P | NEZ | 15 02 40 | 20. | iP iX S | Z NEZ E | 07 53 48.8 50.3 56 54 |
| | 43.6 N., 148.1 E. Kurile Is. region. h: 64 km. H= 15 00 16.8 USCGS | | | | P: C Mag. 6.0 (Mat.) 47.9 N., 153.6 E. Kurile Is. h: 73 km. H= 07 50 05.5 USCGS | | |
| 19. | iP S | NEZ NE | 15 19 27.3 58 | 20. | P | Z | 08 18 40 |
| | P: S, E, D | | | 20. | P S | Z N | 08 26 18 51 |
| 19. | eP | Z | 15 59 45 | 20. | P | Z | 08 38 02 |
| | 41.9 S., 71.2 W. S. Chile-Argentina Border. region. h: 14 km. H= 15 40 39.9 USCGS | | | 20. | P | Z | 10 06 26 |
| 19. | iP NZ, P S | PE NEZ | 19 03 11.0 26 | 20. | iP Z, P S | NE E | 10 14 25.4 16 18 |
| | P: N., D | | | | P: C 43.1 N., 147.8 E. Kurile Is. h: 50 km. H= 10 12 02.3 JMA | | |
| 19. | P eX X | Z N E | 21 08 14 40 45 | 20. | P S | NEZ NE | 10 25 38 55 |
| 19. | P S | Z N | 23 38 48 40 35 | 20. | iP eS | NEZ N | 11 23 34.6 56 |
| | 42.9 N., 147.7 E. Kurile Is. h: 60 km. H= 23 36 29.3 JMA | | | | P: N, E, D | | |
| 20. | P iX | Z Z | 01 30 23 53.5 | 20. | P eS eX | Z E N | 11 26 28 28 43 47 |
| | 44.0 N., 148.6 E. Kurile Is. h: 43 km. H= 01 27 49.9 USCGS | | | | 24.6 N., 141.8 E. Volcano Is. region. h: 95 km. H= 11 23 35.5 USCGS | | |
| 20. | eP eS | N N | 02 33 54 34 31 | 20. | iP Z, P iX eS | N N E | 12 54 29.0 48 59 |
| | P: C | | | | P: C | | |
| 20. | P eS | Z N | 05 36 42 38 33 | 20. | iP eS | NEZ N | 14 22 21.0 23 20 |
| | 43.4 N., 147.4 E. Kurile Is. h: 54 km. H= 05 34 23.2 USCGS | | | | P: N, E, D 40.8 N., 143.1 E. North of Honshu, Japan. h: 0 km. H= 14 20 52.0 JMA | | |
| 20. | iP iS | EZ NE | 05 58 36.5 51.8 | | | | |
| | P: E, C | | | | | | |

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| Date | Phase | Comp. | Time(GMT) h m s | Date | Phase | Comp. | Time(GMT) h m s |
|------|--|-------|--------------------|------|--|-------|--------------------|
| 21. | iX | E | 07 56 06 | 21. | iP | NEZ | 13 52 39.0 |
| | P: S, W, C 43.6 N., 147.2 E. Kurile Is. h: 50 km. H= 07 51 32.0 JMA | | | | 160.6 h 54.1 N., 160.6 E. Near east coast of Kamchatka. h: 75 km. H= 13 47 35.7 USCGS | | |
| 21. | eP | EZ | 09 38 49 | 21. | P | Z | 14 39 01 |
| | | | | | eL N 0.6 13 03 34 eL E 04.2 | | |
| 21. | eP | Z | 09 44 30 | | 23.2 N., 110.6 W. Baja California, USCGS | | |
| | eS | N | 45 02 | | h: 15 km. | | |
| | iX | Z | 07 | | H= 14 25 51.5 USCGS | | |
| 21. | iP | NEZ | 10 07 52.8 | 21. | iP | NEZ | 15 18 41.4 |
| | eX E 08 46 P: N, E, D 41.6 N., 139.0 E. Off south west coast of Hokkaido, Japan. h: 60 km. H= 10 06 36.8 JMA | | | | X EZ 51 P: N, E, D | | |
| 21. | eP | Z | 10 23 30 | 21. | iP | NEZ | 15 49 54.1 |
| | eL | N | 32 10 | | eS | E | 51 36 |
| | eL | E | 33 34 | | P: N, E, D | | |
| | 53.0 N., 169.8 W. Fox Is. Aleutian Is. h: N. H= 10 15 51.3 USCGS | | | 21. | iP | NEZ | 17 15 55.2 |
| 21. | iP | EZ | 13 22 31.1 | | S | N | 17 02 |
| | iX | N | 32.2 | | P: S, W, C 39.6 N., 144.5 E. Off east coast of Honshu, Japan. h: 80 km. H= 17 14 28.0 JMA | | |
| | eS | N | 58 | 21. | P | NEZ | 17 23 08 |
| | iX | Z | 23 06 | | iX | Z | 17.4 |
| | P: E, D 36.4 N., 141.1 E. Off east coast of Honshu, Japan. h: 40 km. H= 13 21 53.3 JMA | | | | iS | NE | 24 52.5 |
| 21. | eP | NZ | 13 26 27 | 21. | iP | Z | 17 41 17.6 |
| | S | E | 28 20 | | P: C | | |
| | L | Z | 30 50 | 21. | iP | Z | 18 00 38.6 |
| | L | E | 52 | | eS | N | 01 04 |
| | 43.1 N., 147.7 E. Kurile Is. region. h: 50 km. H= 13 24 04.5 JMA | | | | P: C | | |
| 21. | P | Z | 13 42 11.4 | 21. | P | NEZ | 19 32 45 |
| | iX | N | 12.0 | | 18.1 S., 177.7 W. Fiji Is. region. h: 385 km. H= 19 22 20.9 USCGS | | |
| | S | N | 42 | 21. | iP | Z | 20 19 22.0 |
| | P: E, D 36.4 N., 141.1 E. Off east coast of Honshu, Japan. h: 40 km. H= 13 41 33.9 JMA | | | | S | NE | 59 |
| | | | | 21. | P | Z | 20 34 24 |
| | | | | | eS | E | 40 04 |
| | | | | | eL | N | 43 12 |
| | | | | | L | E | 32 |
| | | | | | 52.8 N., 169.8 W. Fox Is. Aleutian Is. h: 44 km. H= 20 26 55.6 USCGS | | |

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| Date | Phase | Comp. | Time(GMT) h m s | Date | Phase | Comp. | Time(GMT) h m s |
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| 21. | P eS X P: N, D | Z E N | 22 21 00.3 22 05 10 | | eL eL eL 7.6 S., 156.0 E. Solomon Is. h: 80 km. H= 15 45 04.7 | E Z N | 16 03 40ca. 04 10 05 10 |
| 22. | eP eL L | Z N E | 01 30 33 39 28 40 | | | | USCGS |
| 23. | | | 53.1 N., 170.0 W. Fox Is. Aleutian Is. h: 47 km. H= 01 23 03.7 | 22. | iP S iX P: N, C | NZ E Z | 20 00 36.4 01 18 21.2 |
| 22. | P eS | NZ N | 04 42 47 44 38 | 22. | iP S P: N, E, C | NEZ N | 21 32 12.5 33 20 |
| | | | 42.9 N., 147.5 E. Kurile Is. region. h: 10 km. H= 04 40 26.2 | 22. | iP P: C | Z | 21 57 28.5 |
| 22. | iP eS P: C | Z N | 05 32 38.2 34 36 | 22. | P | Z | 22 30 24 |
| | | | 43.3 N., 148.2 E. Kurile Is. h: 50 km. H= 05 30 11.9 | 22. | P eS X | NEZ E N | 23 32 04 33 47 52 |
| 22. | iP iS P: N, D | NZ N | 05 36 47.0 37 03.8 | 23. | iP X P: S, W, C | NEZ N | 01 53 34.8 54 40 |
| 22. | iP S P: N, D | NZ N | 07 14 46.6 16 44 | 23. | P | EZ | 02 04 22 |
| | | | 43.6 N., 146.3 E. Kurile Is. h: 0 km. H= 07 12 33.0 | 23. | P | EZ | 02 17 13 |
| 22. | eP iX eS | Z EZ N | 08 42 05 16 34 | 23. | P | NEZ | 02 44 58 |
| | | | 23.3 N., 110.4 W. Baja California. h: 11 km. H= 10 04 36.4 | 23. | iP eS eX P: S, W, C | NEZ E N | 02 46 07.2 02 55 44.4 56 38 49 |
| 22. | iP X P: N, E, D | NEZ E | 13 05 48.7 07 01 | | | | 39.8 N., 144.1 E. Off east coast of Honshu, Japan. h: 40 km. H= 02 54 19.4 |
| 22. | iP P: S, W, C | NEZ | 15 09 37.2 | 23. | P X | NEZ NZ | 03 03 41 51 |
| 22. | P eS | NEZ NE | 15 53 28 16 00 28 | 23. | iP eX P: S, W, C | NEZ N | 03 50 54.6 52 08 |

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| Date | Phase | Comp. | Time(GMT) h m s | Date | Phase | Comp. | Time(GMT) h m s |
|------|----------------------------|---------------|--|------|----------------------------|---------------|--|
| | | | 39.7 N., 144.5 E. Off east coast of Honshu, Japan. h: 70 km. H= 03 49 26.8 JMA | 23. | iP X eS | NZ EZ N | 08 58 15.4 26 59 23 |
| 23. | iP | NEZ | 02 58 55.1 P: S, W, C | 23. | P | NEZ | 09 10 46 |
| 23. | iP | NEZ | 04 00 38.0 P: S, W, C | 23. | iP | NEZ | 09 26 48.0 P: S, W, C 39.7 N., 144.3 E. Off east coast of Honshu, Japan. h: 36 km. H= 09 25 22.0 USCGS |
| 23. | iP eX P: D | Z N | 04 06 21.3 07 36 | 23. | P S | NZ NEZ | 10 09 47 10 07 |
| 23. | iP | NEZ | 05 08 28.7 P: S, W, C 39.2 N., 144.8 E. Off east coast of Honshu, Japan. h: N. H= 05 07 02.2 USCGS | 23. | P | NEZ | 10 26 21 |
| 23. | iP S X P: N, E, D | NEZ N E | 06 40 49.8 42 30 34 | 23. | iP eS P: N, E, D | NEZ N | 10 26 56.3 28 04 |
| 23. | P eS | NEZ N | 06 50 17 52 11 | 23. | iP X P: C | Z N | 13 18 00.8 19 06 |
| | | | 39.8 N., 144.5 E. Off east coast of Honshu, Japan. h: 60 km. H= 06 39 21.4 JMA | 23. | iP eS eS | NEZ N | 13 30 01.4 32 19 |
| 23. | P eS | NEZ N | 06 50 17 52 11 | 23. | P eS eS | NEZ E N | 14 55 22 57 12 16 |
| | | | 44.0 N., 148.2 E. Kurile Is. h: 35 km. H= 06 47 49.7 USCGS | 23. | iP iX P: E, D | EZ EZ | 07 00 46.5 57.2 |
| 23. | iP iX P: E, D | EZ EZ | 07 00 46.5 57.2 | 23. | iP P: D | Z | 17 51 28.4 |
| 23. | iP | NEZ | 07 11 09.6 P: S, W, C | 23. | iP S X P: N, E, D | NEZ N E | 19 58 11.5 59 22 27 |
| 23. | P X eX | NEZ Z E | 07 22 43 53 23 55 | 23. | iP | NEZ | 19 58 11.5 59 22 27 |
| 23. | P | Z | 08 02 53 7.6 S., 156.3 E. Solomon Is. h: 55 km. H= 07 54 27.1 USCGS | 23. | eP eX | EZ N | 20 20 52 21 22 |
| 23. | iP eS P: N, E, D | NEZ N | 08 37 47.6 38 54 | 23. | eP | Z | 21 21 00 |

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| Date | Phase | Comp. | Time(GMT) h m s | Date | Phase | Comp. | Time(GMT) h m s |
|------|-------|-------|--|------|------------|-------|--|
| | X | Z | 21 21 21 | 24. | iP EZ, PN | | 11 12 42.5 |
| | X | E | 22 | | P: W, C | | |
| | | | 43.4 N., 147.6 E. Kurile Is. h: N. H= 21 18 39.4 | 24. | P | Z | 12 32 20 |
| | | | USCGS | 24. | iP | NEZ | 12 47 39.1 |
| 24. | P | NEZ | 00 11 06 | | iX | Z | 52.6 |
| | eX | N | 13 09 | | PcP | Z | 49 36 |
| | | | 32.0 N., 132.2 E. Off east coast of Kyushu, Japan. h: 0 km. H= 00 09 21.8 | | eS | N | 54 48 |
| | | | JMA | | eL | E | 59 10 |
| | | | | | P: N, E, C | | |
| | | | | | | | 7.3 S., 148.1 E. East New Guinea region. h: 39 km. H= 12 39 30.1 |
| 24. | iP | NEZ | 02 43 49.7 | 24. | P | NEZ | 13 10 51 |
| | eX | NE | 44 59 | | | | 39.8 N., 144.2 E. Off east coast of Honshu, Japan. h: 35 km. H= 13 09 25.7 |
| | | | P: N, E, D | | | | USCGS |
| 24. | iP | Z | 03 36 12.4 | 24. | iP | EZ | 13 27 23.6 |
| | eS | N | 37 59 | | eS | E | 44 |
| | X | E | 38 01 | | X | N | 47 |
| | | | P: C | | P: W, C | | |
| | | | 43.4 N., 147.4 E. Kurile Is. h: 60 km. H= 03 33 58.6 | 24. | | | 37.0 N., 141.1 E. Off east coast of Honshu, Japan. h: 90 km. H= 13 26 43.4 |
| | | | USCGS | | P | NZ | 14 10 57 |
| 24. | iP | NEZ | 04 51 36.7 | | eS | E | 12 46 |
| | | | P: S, W, C | | | | 43.4 N., 147.2 E. Kurile Is. h: 35 km. H= 14 08 43.5 |
| | | | 40.0 N., 144.2 E. Off east coast of Honshu, Japan. h: N. H= 04 50 11.5 | 24. | eP | Z | 15 09 09ca. |
| | | | USCGS | | | | 54.8 N., 165.4 E. Komandorsky Is. region. h: N. H= 15 03 36.3 |
| 24. | iP | EZ | 05 02 50.4 | 24. | eP | EZ | 15 31 40 |
| | | | P: W, C | | S | N | 32 19 |
| 24. | iP | NEZ | 05 49 25.0 | 24. | iP | NEZ | 18 27 29.2 |
| | | | P: S, W, C | | eX | N | 28 35 |
| 24. | iP | NEZ | 08 40 29.5 | | eX | E | 38 |
| | eX | Z | 41 42 | | P: N, E, D | | |
| | | | P: S, W, C | 24. | iP | NZ | 20 20 20.2 |
| 24. | eP | Z | 09 50 17 | | iX | E | 20.5 |
| 24. | P | EZ | 09 57 26 | | S | NEZ | 43 |
| | X | NE | 38 | | P: S, C | | |
| 24. | iP | NEZ | 10 51 42.5 | | | | |
| | S | N | 52 49 | | | | |
| | | | P: N, E, D | | | | |
| | | | 39.6 N., 144.4 E. Off east coast of Honshu, Japan. h: 90 km. H= 10 50 17.4 | | | | |
| | | | JMA | | | | |

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| Date | Phase | Comp. | Time(GMT) h m s | Date | Phase | Comp. | Time(GMT) h m s |
|------|--------------------------------------|-----------------------------|--|------|-------------------------|-----------------------|---|
| 28. | P eS X | NEZ E N | 04 46 56 48 56 49 06 | 28. | eP X eX | Z NZ N | 16 43 50 56 45 33 |
| 28. | P S | EZ NE | 07 25 19 47 | 28. | P X L eX eX | Z N E E N | 17 02 02 12 05 30 23 20 32 |
| 28. | P eS X | NEZ N E | 11 45 56 46 34 43 | | | | |
| | | | 37.1 N., 142.3 E. Off east coast of Honshu, Japan. h: 40 km. H= 11 45 03.7 | | | | 31.7 N., 177.8 W. Kermadec Is. h: 23 km. H= 16 49 56.8 |
| | | | JMA | | | | USCGS |
| 28. | eP eX | Z N | 13 56 58 57 32 | 28. | P X S | NEZ NZ N | 21 37 42 53 39 33 |
| | | | | | | | 42.9 N., 147.5 E. Kurile Is. h: 0 km. H= 21 35 19.1 |
| 28. | P S X eSS eX eL eL | Z N E N Z NE | 14 06 15 16 20 46 21 00ca. 20 27 20 32 | 28. | P X eS | NZ Z N | 22 11 09 19 12 58 |
| | | | Mag. 6 $\frac{1}{2}$ (Mat.) 31.5 N., 177.9 W. Kermadec Is. h: 29 km. H= 13 54 11.0 | 28. | P X eS S | NZ N E N | 23 12 41 51 15 10 12 |
| | | | USCGS | | | | 22.7 N., 141.9 E. Volcano Is. region. h: 267 km. H= 23 09 32.6 |
| 28. | iP Z, P eS P: S, W, C | NE N C | 14 56 05.5 57 59 | | | | USCGS |
| | | | 43.4 N., 147.7 E. Kurile Is. h: 70 km. H= 14 53 42.9 | 29. | iP iX eS S | NZ Z E N | 01 04 23.0 34.0 06 11 12 |
| | | | JMA | | | | P: S, C 42.9 N., 147.3 E. Kurile Is. h: 0 km. H= 01 02 01.5 |
| 28. | P Z, eP X | NE Z | 15 18 23 50 | | | | JMA |
| | | | 5.8 S., 149.3 E. New Britain, region. h: 100 km. H= 15 10 29.3 | 29. | P iX S | NZ NEZ NE | 03 11 27 40 13 17 |
| | | | USCGS | | | | 42.9 N., 148.1 E. Kurile Is. h: 50 km. H= 03 09 03.4 |
| 28. | P eX | Z E | 15 47 11 49 16 | | | | JMA |
| 28. | iP X | EZ NZ | 16 09 27.8 39 | 29. | eP | Z | 03 36 18 |
| | | | P: E, D | 29. | P S X | EZ E N | 03 23 14 54 56 |
| 28. | P eS | Z E | 16 18 10 19 53 | | | | |
| | | | 43.1 N., 148.8 E. Kurile Is. h: 60 km. H= 16 15 38.5 | | | | JMA |

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| Date | Phase | Comp. | Time(GMT) h m s | Date | Phase | Comp. | Time(GMT) h m s |
|------|--------------------------|------------------------------|---|------|--|-----------------------|---|
| 29. | iP X eX P: C | Z N E | 07 33 56.7 34 44 51 | | P: D 43.4 N., 148.5 E. Kurile Is. h: 100 km. H= 07 11 33.1 | | JMA |
| 29. | P PcP | Z Z | 10 09 53 12 13 | 30. | P eS eX | Z E N | 07 24 34 26 18 23 |
| 29. | P X eX eX eL | NEZ Z E Z N Z | 10 15 06 49 18 10 18 36 21 24 | | 43.6 N., 147.7 E. Kurile Is. h: 45 km. H= 07 22 10.9 | | USCGS |
| | | | 39.7 N., 142.1 E. Near east coast of Honshu, Japan. h: 40 km. H= 19 13 57.1 | | | | JMA |
| 29. | eP | Z | 11 07 35 | 30. | P S | NZ N | 07 30 29 32 28 |
| | | | 10.3 S., 111.9 E. South of Java. h: 36 km. H= 10 58 22.7 | | | | USCGS |
| 29. | P S | Z N | 11 41 23 55 | 30. | P eS P: S, W, C | NEZ NE | 07 56 41.9 58 27 |
| 29. | iP eL P: C | Z NZ | 12 22 57.8 31 18 | | 43.1 N., 146.6 E. Kurile Is. h: 40 km. H= 07 54 28.2 | | JMA |
| | | | 1.6 N., 126.5 E. Molucca Passage. h: N. H= 12 15 54.9 | | | | USCGS |
| 30. | P S | EZ NE | 02 12 42 13 27 | 30. | iP X S X | NZ, PE E E N | 08 30 28.2 44 32 15 22 |
| 30. | P X eS | Z Z E | 03 51 24 29 52 10 | | P: S, C 43.0 N., 148.3 E. Kurile Is. h: 50 km. H= 08 28 01.2 | | JMA |
| 30. | iP X P: C | Z Z | 05 51 46.1 52 19 | 30. | P | NEZ | 08 39 43 |
| | | | | | | | 43.8 N., 148.0 E. Kurile Is. region. h: N. H= 08 37 21.0 |
| 30. | P X X | NEZ N N | 06 54 57 55 13 57 08 | | | | USCGS |
| | | | 43.4 N., 148.3 E. Kurile Is. h: 70 km. H= 06 52 30.3 | | | | JMA |
| 30. | iP iX S | Z NEZ N | 07 14 02.4 04.3 15 51 (cont.) | 30. | iP S P: N, C | NZ NE | 08 50 28.6 52 20 33 |
| | | | | | | | 44.0 N., 147.9 E. Kurile Is. h: 40 km. H= 08 48 08.2 |
| | | | | | | | USCGS |
| | | | | | | | 09 21 22.7 54 |

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| Date | Phase | Comp. | Time(GMT) | | | Date | Phase | Comp. | Time(GMT) | | |
|------|---------------------------|----------------|-----------|----|----------------------|------|--|-----------------|-----------|----|-----------------------|
| | | | h | m | s | | | | h | m | s |
| 31. | iP iS P: N,C | NZ Z | 11 | 45 | 10.5 17.4 | 31. | iP eS P: C | Z N | 17 | 40 | 27.2 50 |
| 31. | P S | Z N | 11 | 45 | 28.4 35.5 | 31. | iP iX S P: S, W, C | NEZ NZ NE | 18 | 09 | 17.5 29.7 10 24 |
| 31. | iP iS P: N, E, C | NEZ NEZ | 12 | 01 | 30.7 37.6 | 31. | iP iS P: N, E | NEZ NEZ | 19 | 13 | 23.9 31.0 |
| 31. | iP iS P: E | EZ E | 12 | 33 | 38.8 45.4 | 31. | iP iS P: C | Z NE | 19 | 13 | 33.3 39.5 |
| 31. | iP iS P: N, E, C | NEZ NEZ | 13 | 00 | 55.6 01 02.5 | 31. | iP iS P: N, E, C | NEZ NEZ | 19 | 23 | 38.9 45.6 |
| 31. | iP iX iS P: N, E | NEZ Z NE | 13 | 29 | 49.0 54.8 56.0 | 31. | iP iS P: N, E, C | NEZ NEZ | 19 | 26 | 16.0 23.0 |
| 31. | eP S | Z Z | 13 | 30 | 17 25 | 31. | iP iS P: N, E, C | NEZ NEZ | 19 | 29 | 46.2 53.2 |
| 31. | iP S P: E, C | EZ EZ | 13 | 33 | 45.9 52.8 | 31. | iP iS P: N, E, C | NEZ NEZ | 19 | 38 | 27.6 34.7 |
| 31. | iP iS P: N, E, C | NEZ E | 13 | 42 | 23.5 30.5 | 31. | iP iS P: N, E, C | NEZ NEZ | 19 | 40 | 25.0 32.1 |
| 31. | iP iS P: N, E, C | NEZ E | 14 | 11 | 22.9 29.7 | 31. | iP S P: N, E, C | NEZ NEZ | 19 | 59 | 31.9 54 |
| 31. | iP iS P: E | NEZ N | 15 | 12 | 51.4 58.5 | 31. | P eL eL 18.2 S., 168.1 E. New Hebrides Is. h: 32 km. H= 19 58 17.4 | NZ N E | 20 | 08 | 31 22 42 23 50 |
| 31. | iP iS P: N, E | NEZ N | 15 | 35 | 30.0 37.3 | 31. | iPEZ, P N iS P: E, C | NEZ NEZ | 20 | 09 | 08.0 14.3 |
| 31. | iP iS P: N, E, C | NEZ NEZ | 17 | 04 | 29.6 36.6 | 31. | P Z | Z | 20 | 16 | 54 |
| 31. | iP iS P: N, E, C | NEZ EZ | 17 | 11 | 22.9 29.8 | 31. | iP iS P: N, E, C | NEZ NEZ | 20 | 28 | 08.5 15.3 |
| 31. | eP eX X | Z NE N | 17 | 23 | 17 25 35 | 31. | iP P: C | Z | 20 | 58 | 52.1 |

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Date Phase Comp. Time(GMT)
h m s

19.8 S., 177.9 W.

Fiji Is. region.
h: 400 km.

H= 20 48 22.6

USCGS

31. iP NEZ 21 01 01.4
iS NEZ 08.3
P: N, E, C

31. iP NEZ 21 16 15.1
iS NEZ 22.0
P: N, E, C

31. iP NEZ 22 17 25.0
iS NE 32.0
P: N, E, C

31. P NEZ 22 19 18.0
iX EZ 29
eS N 20 53
X NE 21 10

43.4 N., 146.7 E.

Kurile Is.

h: 59 km.

H= 22 17 04.7

USCGS

31. iP NEZ 23 22 40.7
iS NE 47.7
P: N, E, C

Date Phase Comp. Time(GMT)
h m s

Mineo Takehana

Director