International Seismological Centre

# SEISMOLOGICAL BULLETIN
# OF
# MATSUSHIRO

MAY , JUNE
1969

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

Matsushiro Seismological Observatory , Japan

Seismological Bulletin

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

Instrumental Constants

| Instruments | Comp. | Period (sec.) | Damping ratio | Magnification |
|---|---|---|---|---|
| Benioff 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 | $T_1 = 1.0$ $T_2 = 0.21$ | $h_1 = 0.67$ $h_2 = 1.2$ | 67,000 (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 | $T = 0.8$ | $h = 0.8$ | 1,300 |
| | E | $T = 0.8$ | $h = 0.8$ | 1,200 |

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| Date | Phase | Comp. | Time(GMT) h m s |
|---|---|---|---|
| 1. | iP | Z | 03 23 24.3 |
| | iX | NE | 25 |
| | eX | N | 36 40 |
| | P: C | | |
| | 21.0 S., 174.6 W. | | |
| | Tonga Is. | | |
| | h: N. | | |
| | H= 03 11 58.3 | | USCGS |
| 1. | P | EZ | 05 17 23 |
| | iX | N | 24 |
| | 21.4 S., 174.6 W. | | |
| | Tonga Is. | | |
| | h: 32 km. | | |
| | H= 05 05 55.8 | | USCGS |
| 1. | iP EZ, P N | | 10 17 46.0 |
| | iX | E | 18 10.7 |
| | P: E,C | | |
| 1. | P | EZ | 10 23 18 |
| | iX | N | 51.5 |
| 1. | eP | Z | 11 17 07 |
| | eX | N | 21 20 |
| | eX | E | 23 40 |
| | eX | N | 24 00 |
| 1. | P | Z | 11 26 04 |
| | eX | N | 06 |
| | eX | Z | 45 |
| | 52.3 N., 160.7 E. | | |
| | Off east coast of Kamchatka. | | |
| | h: N. | | |
| | H= 11 21 07.5 | | USCGS |
| 1. | P | NEZ | 11 58 49 |
| | S | NEZ | 12 03 30 |
| | iX | NE | 06 20 |
| | 5.1 N., 125.2 E. | | |
| | Mindanao, P.I. | | |
| | h: 230 km. | | |
| | H= 11 52 30.1 | | USCGS |
| 1. | eP | Z | 16 42 20 |
| | ePP | N | 44 00 |
| | eS | N | 48 16 |
| | eL | NE | 51 12 |
| | 1.3 N., 120.5 E. | | |
| | Northern Celebes. | | |
| | h: 62 km. | | |
| | H= 16 34 58.9 | | USCGS |
| 1. | P | NEZ | 18 14 42 |
| | 35.4 N., 27.7 E. | | |
| | Dodecanese Is. | | |
| | h: 37 km. | | |
| | H= 18 02 14.6 | | USCGS |

| Date | Phase | Comp. | Time(GMT) h m s |
|---|---|---|---|
| 1. | iP | NEZ | 19 16 11.1 |
| | pP | NEZ | 17 20 |
| | pPPP | NE | 21 00 |
| | S | NE | 25 58 |
| | ScS | NE | 26 40 |
| | eX | E | 34 08 |
| | eX | N | 30 |
| | ePKP2PKP2 | Z | 45 10 |
| | P: S,E,D | | |
| | Mag. 6.0 (CGS) | | |
| | 16.8 S., 174.7 W. | | |
| | Tonga Is. | | |
| | h: 205 km. | | |
| | H= 19 05 24.7 | | USCGS |
| 1. | eP | Z | 20 19 09 |
| | iX | Z | 28 |
| | eS | NE | 29 32 |
| | eSSS | N | 39 00 |
| | eL | E | 41 10 |
| | eL | E | 47 34 |
| | eL | N | 48 00 |
| | 35.3 N., 27.6 E. | | |
| | Dodecanese Is. | | |
| | h: 32 km. | | |
| | H= 20 06 40.9 | | USCGS |
| 2. | P | EZ | 03 19 54 |
| | eS | N | 23 40 |
| | eX | E | 54 |
| | eL | N | 25 00 |
| | 22.9 N., 120.5 E. | | |
| | Taiwan. | | |
| | h: 50 km. | | |
| | H= 03 15 16.4 | | USCGS |
| 2. | P | Z | 18 29 20 |
| | S | NE | 30 16 |
| 2. | iP | NEZ | 20 41 36.6 |
| | iX | NEZ | 41 |
| | S | E | 43 03 |
| | iX | Z | 13 |
| | P: S,W,C | | |
| | 40.9 N., 143.2 E. | | |
| | Off east coast of Honshu, Japan. | | |
| | h: 40 km. | | |
| | H= 20 40 08.7 | | JMA |
| 2. | iP | NEZ | 22 46 57.9 |
| | S | NZ | 47 54 |
| | iX | E | 48 00 |
| | P: S,W,C | | |
| | 40.1 N., 142.5 E. | | |
| | Near east coast of Honshu, Japan. | | |
| | h: 30 km. | | |
| | H= 22 45 41.8 | | JMA |

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| Date | Phase | Comp. | Time(GMT) h m s | |
|---|---|---|---|---|
| 3. | iP | NZ | 06 13 22.0 | |
| | iX | NE | 14 10 | |
| | P: N,C | | | |
| 3. | eP | Z | 07 25 27 | |
| | 19.1 N., 145.4 E. | | | |
| | Mariana Is. | | | |
| | h: 132 km. | | | |
| | H= 07 21 18.9 | | | USCGS |
| 3. | P | NEZ | 08 31 14 | |
| | 8.3 N., 175.6 W. | | | |
| | North Pacific Ocean. | | | |
| | h: N. | | | |
| | H= 08 22 14.8 | | | USCGS |
| 3. | P | EZ | 11 45 46 | |
| | 55.3 N., 166.9 E. | | | |
| | Komandorsky Is. region. | | | |
| | h: N. | | | |
| | H= 11 40 04.6 | | | USCGS |
| 3. | iP | EZ | 12 34 25.0 | |
| | S | N | 35 05 | |
| | iX | E | 07 | |
| | P: D | | | |
| 3. | iP | NEZ | 15 46 47.8 | |
| | S | NEZ | 47 03 | |
| | P: S,E,D | | | |
| | 35.5 N., 138.9 E. | | | |
| | Central Honshu, Japan. | | | |
| | h: 20 km. | | | |
| | H= 15 46 [illegible].5 | | | JMA |
| 3. | P | EZ | 18 37 29 | |
| | S | N | 59 | |
| 3. | P | NEZ | 18 57 29 | |
| | 52.[illegible] N., 1[illegible].2 W. | | | |
| | Fox Is. | | | |
| | h: [illegible] km. | | | |
| | H= 18 50 09.[illegible] | | | USCGS |
| 3. | iP | NEZ | 19 10 18.6 | |
| | S | E | 47 | |
| | P: N,W,C | | | |
| | 35.9 N., 141.[illegible] E, | | | |
| | Near east coast of Honshu, Japan. | | | |
| | h: [illegible]0 km. | | | |
| | H= [illegible]9 09 39.4 | | | JMA |
| 4. | iP | NEZ | 02 37 39.2 | |
| | S | N | 38 15 | |
| | P: N,C | | | |
| | 3[illegible].0 N., 140.5 E. | | | |
| | South of Central Honshu, Japan. | | | (cont.) |

| Date | Phase | Comp. | Time(GMT) h m s | |
|---|---|---|---|---|
| | h: 80 km. | | | |
| | H= 02 36 48.3 | | | JMA |
| 4. | iP | NEZ | 06 40 43.1 | |
| | S | E | 42 10 | |
| | P: N,W,C | | | |
| | 40.3 N., 142.7 E. | | | |
| | Near east coast of Honshu, Japan. | | | |
| | h: 30 km. | | | |
| | H= 06 39 24.0 | | | JMA |
| 4. | P | NEZ | 07 18 02 | |
| | iX | Z | 10 | |
| | 17.6 S., 178.9 W. | | | |
| | Fiji Is. region. | | | |
| | h: 578 km. | | | |
| | H= 07 08 01.4 | | | USCGS |
| 4. | P | Z | 09 26 55 | |
| | eX | N | 28 04 | |
| 4. | P | NEZ | 09 38 33 | |
| | S | NEZ | 47 | |
| 4. | P | Z | 12 46 49 | |
| | iX | E | 57 | |
| | S | NE | 55 06 | |
| | SS | N | 59 16 | |
| | L | NE | 13 01 55 | |
| | L | NZ | 04 50 | |
| | Mag. 6¼ (Mat.) | | | |
| | 17.4 S., 168.9 E. | | | |
| | New Hebrides Is. | | | |
| | h: 11 km. | | | |
| | H= 12 36 33.4 | | | USCGS |
| 4. | P | Z | 15 20 35 | |
| | iX | NE | 38 | |
| | pP | Z | 21 09 | |
| | 8.6 S., 121.4 E. | | | |
| | Flores I. region. | | | |
| | h: 94 km. | | | |
| | H= 15 12 07.6 | | | USCGS |
| 4. | P | NEZ | 16 54 56 | |
| | S | NEZ | 55 17 | |
| 4. | iP | NEZ | 17 25 49.0 | |
| | pP | Z | 26 27 | |
| | iX | E | 31 | |
| | pPP | Z | 27 58 | |
| | eS | N | 32 15 | |
| | eL | N | 34 12 | |
| | eL | E | 30 | |
| | P: N,E,C | | | |
| | 0.[illegible] N., [illegible].3 E. | | | |
| | Northern Celebes. | | | |
| | h: 165 km | | | (cont.) |

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| Date | Phase | Comp. | Time(GMT) h m s |
|---|---|---|---|
| | H= 17 18 38.8 | | USCGS |
| 4. | P | EZ | 17 31 32 |
| 4. | P | EZ | 17 54 56 |
| | 29.2 S., 179.1 W. | | |
| | Kermadec Is. | | |
| | h: 319 km. | | |
| | H= 17 43 38.9 | | USCGS |
| 4. | P | NZ | 21 03 15 |
| | S | E | 04 14 |
| 4. | iP | Z | 21 45 36.5 |
| | iX | N | 56 |
| | P: D | | |
| 5. | P | EZ | 01 54 00 |
| | iX | N | 28 |
| 5. | eX | E | 02 33 36 |
| | eX | E | 39 50 |
| | eL | E | 49 00 |
| 5. | P | Z | 02 48 20 |
| | eX | E | 49 08 |
| 5. | P | NZ | 03 16 34 |
| 5. | P | Z | 04 09 05 |
| | S | E | 29 |
| | iX | N | 31 |
| | iX | Z | 33 |
| | iX | Z | 41 |
| 5. | P | NZ | 07 33 39 |
| | iX | E | 34 07 |
| | 39.7 N., 141.8 E. | | |
| | North of Honshu, Japan. | | |
| | h: 100 km. | | |
| | H= 07 32 35.3 | | JMA |
| 5. | P | EZ | 08 20 52 |
| | iX | N | 54 |
| | S | E | 21 16 |
| 5. | eP | Z | 09 52 02 |
| | 28.1 N., 130.0 E. | | |
| | Ryukyu Is. | | |
| | h: 42 km. | | |
| | H= 09 49 26.9 | | USCGS |
| 5. | P | NEZ | 10 16 56 |
| | 32.6 N., 141.5 E. | | |
| | South of Honshu, Japan. | | |
| | h: N. | | |
| | H= 10 15 43.8 | | USCGS |

| Date | Phase | Comp. | Time(GMT) h m s |
|---|---|---|---|
| 5. | P | NEZ | 12 15 53 |
| | S | NE | 16 18 |
| 5. | ePKP | Z | 14 12 28 |
| | iX | Z | 53 |
| | PKP2 | Z | 13 02 |
| | 30.8 S., 71.8 W. | | |
| | Near coast of Central Chile. | | |
| | h: 38 km. | | |
| | H= 13 52 39.6 | | USCGS |
| 5. | P | NEZ | 15 00 57 |
| | 41.0 N., 142.2 E. | | |
| | Near east coast of Honshu, Japan. | | |
| | h: 50 km. | | |
| | H= 14 59 35.6 | | JMA |
| 5. | iP NZ, P E | | 17 52 54.8 |
| | P: N,D | | |
| | 48.1 N., 146.8 E. | | |
| | Sea of Okhotsk. | | |
| | h: 434 km. | | |
| | H= 17 50 00.8 | | USCGS |
| 6. | iP Z, P NE | | 02 19 38.5 |
| | S | NE | 20 00 |
| | P: D | | |
| 6. | P | Z | 06 54 41 |
| | iX | NEZ | 42 |
| | iX | NEZ | 55 |
| | iX | NE | 55 05 |
| | 36.1 N., 140.0 E. | | |
| | Southeast of Honshu, Japan. | | |
| | h: 70 km. | | |
| | H= 06 54 14.9 | | JMA |
| 6. | iP | EZ | 11 25 36.0 |
| | S | NEZ | 48 |
| | P: E,D | | |
| 7. | P | Z | 04 06 13 |
| | S | NEZ | 40 |
| 7. | P | NEZ | 04 11 26 |
| | iX | E | 13 00 |
| | 44.1 N., 142.8 E. | | |
| | Hokkaido, Japan. | | |
| | h: 220 km. | | |
| | H= 04 09 28.9 | | JMA |
| 7. | P | EZ | 04 18 34 |
| 7. | P | NEZ | 08 58 23 |
| | iX | Z | 50 |
| | S | N | 09 02 50 |

(cont.)

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| Date | Phase | Comp. | Time(GMT) h m s |
|---|---|---|---|
| | iX | E | 09 04 16 |
| | 12.1 N., 124.6 E. | | |
| | Samar, P.I. | | |
| | h: 134 km. | | |
| | H= 08 52 50.8 | | USCGS |
| 7. | P | NZ | 09 33 02 |
| | 31.2 S., 179.2 W. | | |
| | Kermadec Is. | | |
| | h: 158 km. | | |
| | H= 09 21 18.2 | | USCGS |
| 7. | iP | NEZ | 10 35 34.0 |
| | iX | EZ | 47 |
| | S | NE | 57 |
| | P: S,E,D | | |
| | 35.2 N., 139.6 E. | | |
| | Near south coast of Honshu, Japan. | | |
| | h: 120 km. | | |
| | H= 10 35 01.8 | | JMA |
| 7. | P | Z | 12 49 03 |
| | iX | NEZ | 10 |
| 7. | eP | Z | 15 43 43 |
| | iX | N | 44 |
| | iX | Z | 44 05 |
| | 44.2 N., 149.7 E. | | |
| | Kurile Is. | | |
| | h: N. | | |
| | H= 15 40 56.7 | | USCGS |
| 7. | P | Z | 17 29 38 |
| | eS | E | 30 03 |
| | iX | E | 05 |
| 7. | eP | Z | 22 25 35 |
| | eS | N | 32 14 |
| | eX | E | 35 50 |
| | eL | N | 38 30 |
| | 5.2 S., 152.7 E. | | |
| | New Britain region. | | |
| | h: 54 km. | | |
| | H= 22 17 35.4 | | USCGS |
| 8. | iP | Z | 01 53 14.4 |
| | iX | Z | 28 |
| | P: D | | |
| 8. | P | Z | 01 55 14 |
| | eX | Z | 23 |
| | S | N | 59 20 |
| | iX | E | 30 |
| | L | NE | 02 01 30 |
| | 13.3 N., 144.9 E. | | |
| | Mariana Is. | | |
| | h: 51 km. | | |
| | H= 01 50 02.7 | | USCGS |

| Date | Phase | Comp. | Time(GMT) h m s |
|---|---|---|---|
| 8. | iP Z, P NE | | 02 44 50.8 |
| | S | NZ | 59 |
| | P: C | | |
| 8. | iP | EZ | 02 48 34.8 |
| | iX | Z | 36 |
| | iX | NE | 37 |
| | S | N | 49 02 |
| | P: W,C | | |
| | 35.2 N., 140.5 E. | | |
| | Near east coast of Honshu, Japan. | | |
| | h: 40 km. | | |
| | H= 02 47 58.5 | | JMA |
| 8. | P | NEZ | 04 24 44 |
| 8. | P | Z | 07 45 10 |
| | iX | NEZ | 17 |
| 8. | iP Z, P NE | | 16 42 29.2 |
| | eX | N | 43 21 |
| | P: C | | |
| 8. | P | NEZ | 16 55 36 |
| 8. | iP | NEZ | 18 38 26.4 |
| | P: N,E,D | | |
| | 40.9 N., 143.3 E. | | |
| | Near east coast of Honshu, Japan. | | |
| | h: 40 km. | | |
| | H= 18 36 57.3 | | JMA |
| 8. | iP | Z | 20 54 44.2 |
| | iX | NE | 44.6 |
| | eS | E | 56 42 |
| | eX | Z | 46 |
| | eX | N | 48 |
| | eL | N | 57 30 |
| | P: C | | |
| | 44.1 N., 148.7 E. | | |
| | Kurile Is. | | |
| | h: 40 km. | | |
| | H= 20 52 09.9 | | JMA |
| 8. | eP | Z | 22 17 00 |
| | iX | NZ | 07 |
| 8. | iP Z, P N | | 22 45 06.5 |
| | eS | N | 51 20 |
| | eSS | E | 54 50 |
| | eScS | N | 55 06 |
| | eL | N | 58 00 |
| | P: C | | |
| | 5.6 S., 146.2 E. | | |
| | East New Guinea region. | | |
| | h: 76 km. | | |
| | H= 22 37 16.8 | | USCGS |

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| Date | Phase | Comp. | Time(GMT) h m s | |
|---|---|---|---|---|
| 9. | iP | EZ | 00 37 20.5 | |
| | P: E,D | | | |
| 9. | eP | Z | 03 43 11 | |
| 9. | iP | NZ | 06 55 34.7 | |
| | S | NE | 56 07 | |
| | P: S,C | | | |
| 9. | iP Z, P NE | | 08 38 40.3 | |
| | S | NE | 39 13 | |
| | P: C | | | |
| 9. | P | Z | 09 39 55 | |
| | iX | E | 56 | |
| 9. | P | EZ | 11 40 53 | |
| 9. | P | NEZ | 13 35 18 | |
| | iX | N | 40 | |
| 9. | eP | NEZ | 17 03 27 | |
| | 47.7 N., 155.6 E. | | | |
| | Kurile Is. region. | | | |
| | h: N. | | | |
| | H= 16 59 34.0 | | | USCGS |
| 10. | iP Z, P E | | 01 43 40.4 | |
| | eX | Z | 44 19 | |
| | eS | NE | 51 56 | |
| | P: C | | | |
| | 19.4 N., 155.1 W. | | | |
| | Hawai. | | | |
| | h: 11 km. | | | |
| | H= 01 33 27.6 | | | USCGS |
| 10. | iP | NEZ | 02 15 32.0 | |
| | iS | NE | 59.6 | |
| | P: N,E,C | | | |
| 10. | iP Z, P NE | | 08 36 25.7 | |
| | S | NE | 32 | |
| | P: C | | | |
| 10. | P | NEZ | 10 49 22 | |
| | S | E | 50 07 | |
| 10. | iP NZ, P E | | 12 17 55.0 | |
| | P: N,D | | | |
| | 28.1 S., 178.1 W. | | | |
| | Kermadec Is. | | | |
| | h: 196 km. | | | |
| | H= 12 06 27.3 | | | USCGS |
| 10. | P | NEZ | 13 06 30 | |
| | S | NE | 13 34 | |
| | eL | N | 20 22 | |
| | 56.4 N., 153.6 W. | | | |
| | Kodiak I. region. | | | (cont.) |

| Date | Phase | Comp. | Time(GMT) h m s | |
|---|---|---|---|---|
| | h: N. | | | |
| | H= 12 57 47.8 | | | USCGS |
| 10. | P | NEZ | 14 30 33 | |
| | S | NEZ | 46 | |
| 10. | P | NEZ | 16 57 28 | |
| | eS | E | 58 40 | |
| 10. | P | NEZ | 19 07 01 | |
| | eS | NE | 08 | |
| 10. | eP | Z | 20 17 19 | |
| | 27.8 S., 177.0 W. | | | |
| | Kermadec Is. | | | |
| | h: 34 km. | | | |
| | H= 20 05 30.7 | | | USCGS |
| 10. | P | NEZ | 21 51 53 | |
| 11. | eP | Z | 00 30 20 | |
| | 14.3 N., 56.7 E. | | | |
| | Arabian Sea. | | | |
| | h: 32 km. | | | |
| | H= 00 18 41.9 | | | USCGS |
| 11. | iP | Z | 01 23 25.4 | |
| | eS | N | 24 37 | |
| | P: D | | | |
| 11. | eP | Z | 03 31 16 | |
| 11. | iP | NEZ | 10 45 23.5 | |
| | S | E | 47 31 | |
| | P: N,E,D | | | |
| | 43.4 N., 148.5 E. | | | |
| | Kurile Is. | | | |
| | h: 50 km. | | | |
| | H= 10 42 46.4 | | | JMA |
| 11. | P | Z | 12 14 27 | |
| | iX | E | 37 | |
| | iX | E | 15 11 | |
| | 17.8 N., 145.9 E. | | | |
| | Mariana Is. | | | |
| | h: 135 km. | | | |
| | H= 12 10 04.9 | | | USCGS |
| 11. | eP | Z | 12 18 04 | |
| 11. | P | Z | 14 28 30 | |
| | eS | N | 37 20 | |
| | L | E | 46 20 | |
| | [illegible] | N | 30 | |
| | 21.8 S., 175.1 W. | | | |
| | Tonga Is. | | | |
| | h: N. | | | |
| | H= 14 17 11.9 | | | USCGS |

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| Date | Phase | Comp. | Time(GMT) h m s |
|---|---|---|---|
| 11. | iP NZ, P E | | 16 05 47.0 |
| | S | N | 07 04 |
| | P: N,D | | |
| | 40.9 N., 142.3 E. | | |
| | Near east coast of Honshu, Japan. | | |
| | h: 40 km. | | |
| | H= 16 04 31.0 | | JMA |
| 11. | eP | Z | 21 51 02 |
| 11. | P | Z | 22 14 03 |
| 11. | eL | NE | 23 18 10 |
| 12. | iP | EZ | 07 49 10.3 |
| | S | NE | 37 |
| | P: E,C | | |
| 12. | iP | EZ | 08 24 28.6 |
| | iX | N | 29.3 |
| | P: W,C | | |
| 12. | eP | Z | 08 41 10 |
| | eX | N | 42 08 |
| 12. | iP | NEZ | 18 53 34.2 |
| | S | NEZ | 59 |
| | P: S,E,D | | |
| | 34.6 N., 139.5 E. | | |
| | Near south coast of Honshu, Japan. | | |
| | h: 40 km. | | |
| | H= 18 53 00.4 | | JMA |
| 12. | iP Z, P N | | 22 32 26.5 |
| | iX | EZ | 29.0 |
| | P: C | | |
| | 41.3 N., 142.4 E. | | |
| | Hokkaido, Japan region. | | |
| | h: 40 km. | | |
| | H= 22 30 55.1 | | JMA |
| 13. | P | NEZ | 03 44 39 |
| | S | NEZ | 54 |
| 13. | iP | NEZ | 03 55 21.8 |
| | iX | Z | 36 |
| | eS | NZ | 42 |
| | P: S,E,D | | |
| | 35.4 N., 140.7 E. | | |
| | Near east coast of Honshu, Japan. | | |
| | h: 80 km. | | |
| | H= 03 54 51.3 | | JMA |
| 13. | iP Z, P E | | 05 31 11.0 |
| | S | NE | 41 |
| | P: C | | |

| Date | Phase | Comp. | Time(GMT) h m s |
|---|---|---|---|
| 13. | P | Z | 06 07 17 |
| | 1.3 N., 126.3 E. | | |
| | Molucca Passage. | | |
| | h: 13 km. | | |
| | H= 06 00 07.4 | | USCGS |
| 13. | P | Z | 09 10 57 |
| 13. | P | Z | 11 40 51 |
| | S | NEZ | 41 18 |
| 13. | iP | NEZ | 14 20 15.5 |
| | iX | EZ | 28 |
| | iX | N | 34 |
| | P: N,E,D | | |
| | 36.3 N., 140.4 E. | | |
| | Near east coast of Honshu, Japan. | | |
| | h: 50 km. | | |
| | H= 14 19 43.2 | | JMA |
| 13. | P | Z | 14 35 31 |
| | ePP | Z | 36 31 |
| | 11.5 N., 86.4 W. | | |
| | Near coast of Nicaragua. | | |
| | h: 79 km. | | |
| | H= 14 16 52.8 | | USCGS |
| 13. | iP | NZ | 14 37 53.5 |
| | iX | E | 54.3 |
| | iPcP | Z | 39 16 |
| | ipP | Z | 51 |
| | eX | Z | 41 40 |
| | iScP | Z | 42 11.3 |
| | iS | E | 43 56.5 |
| | iS | N | 58.0 |
| | iS | Z | 44 00 |
| | ScS | E | 46 30 |
| | iX | E | 53 08 |
| | L | E | 15 06 00 |
| | L | N | 07 00 |
| | P: S,D | | |
| | Mag. $6\frac{1}{4}$ - $6\frac{1}{2}$ (Mat.) | | |
| | 7.2 S., 120.9 E. | | |
| | Flores Sea. | | |
| | h: 616 km. | | |
| | H= 14 30 19.6 | | USCGS |
| 13. | eP | Z | 22 58 49 |
| 14. | eP | Z | 00 45 15 |
| | 0.3 N., 124.0 E. | | |
| | Northern Celebes. | | |
| | h: 167 km. | | |
| | H= 00 38 08.6 | | USCGS |
| 14. | P | Z | 10 17 43 |
| | eS | N | 28 00 |

(cont.)

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| Date | Phase | Comp. | Time(GMT) h m s |
|---|---|---|---|
| | eSSS | N | 10 47 06 |
| | 35.3 N., 27.8 E. | | |
| | Dodecanese Is. | | |
| | h: 34 km. | | |
| | H= 10 05 15.8 | | USCGS |
| 14. | iP Z, P N | | 12 58 29.5 |
| | S | NE | 49 |
| | P: D | | |
| | 37.5 N., 137.4 E. | | |
| | Near north coast of central Honshu, Japan. | | |
| | h: 0 km. | | |
| | H= 12 58 02.6 | | JMA |
| 14. | iP NZ, P E | | 16 06 32.2 |
| | S | N | 07 03 |
| | P: S,D | | |
| | 34.2 N., 139.6 E. | | |
| | South of Central Honshu, Japan. | | |
| | h: 30 km. | | |
| | H= 16 05 50.9 | | JMA |
| 14. | iP | NEZ | 19 39 31.4 |
| | PP | Z | 40 36 |
| | S | E | 44 50 |
| | L | E | 47 00 |
| | L | N | 15 |
| | P: S,W,C | | |
| | Mag. 7¼ - 7½ (Mat.) | | |
| | 51.3 N., 179.9 W. | | |
| | Andreanof Is. | | |
| | h: 21 km. | | |
| | H= 19 32 54.2 | | USCGS |
| 14. | P | Z | 19 45 55 |
| | S | NE | 49 55 |
| 14. | P | Z | 20 17 17 |
| | iX | Z | 32.5 |
| | 51.3 N., 179.9 W. | | |
| | Andreanof Is. | | |
| | h: 15 km. | | |
| | H= 20 10 39.3 | | USCGS |
| 14. | iP | NEZ | 20 36 23.6 |
| | P: S,W,C | | |
| | 43.2 N., 146.4 E. | | |
| | Kurile Is. | | |
| | h: 40 km. | | |
| | H= 20 34 10.8 | | JMA |
| 15. | iP | NEZ | 01 56 44.2 |
| | S | NEZ | 57 11 |
| | P: S,E,D | | |
| | 34.5 N., 140.1 E. | | |
| | Near east coast of Honshu, Japan. | | (cont.) |

| Date | Phase | Comp. | Time(GMT) h m s |
|---|---|---|---|
| | h: 70 km. | | |
| | H= 01 56 08.0 | | JMA |
| 15. | P | Z | 02 03 53 |
| | eS | E | 04 19 |
| 15. | eP | Z | 02 07 58 |
| 15. | P | Z | 02 21 45 |
| 15. | P | Z | 02 33 16 |
| 15. | iP | NEZ | 02 50 14.0 |
| | iS | N | 41.8 |
| | P: S,E,D | | |
| | 34.5 N., 140.0 E. | | |
| | Central Honshu, Japan. | | |
| | h: 70 km. | | |
| | H= 02 49 37.8 | | JMA |
| 15. | iP | NZ | 02 59 26.0 |
| | S | NE | 53 |
| | P: N,D | | |
| 15. | P | Z | 03 09 40 |
| | S | N | 10 06 |
| 15. | P | Z | 03 31 54 |
| | S | N | 32 20 |
| 15. | iP | Z | 04 04 18.0 |
| | S | N | 44 |
| | P: C | | |
| 15. | P | Z | 04 30 26 |
| | S | N | 53 |
| 15. | P | Z | 04 36 23 |
| | iS | NE | 35.5 |
| 15. | iP | NEZ | 05 40 11.5 |
| | S | E | 37 |
| | P: S,E,D | | |
| 15. | P | Z | 06 54 59 |
| | S | N | 55 26 |
| 15. | P | Z | 07 07 27 |
| 15. | eP | Z | 07 13 13 |
| 15. | P | Z | 07 38 16 |
| | S | E | 42 |
| 15. | P | Z | 07 58 23 |
| | S | N | 08 02 40 |
| | 16.1 N., 121.9 E. | | |
| | Luzon, P.I. | | |
| | h: 57 km. | | (cont.) |

May , 1969

| Date | Phase | Comp. | Time(GMT) h m s |
|---|---|---|---|
| | H= 07 53 03.8 | | USCGS |
| 15. | eP | Z | 09 12 39 |
| 15. | P | Z | 10 17 36 |
| | S | N | 18 03 |
| 15. | iP | NEZ | 11 12 33.0 |
| | S | E | 59 |
| | P: S,E,D | | |
| 15. | iP | NEZ | 12 08 49.5 |
| | S | NEZ | 09 17 |
| | P: N,E,C | | |
| 15. | iP Z, P NE | | 12 15 44.4 |
| | P: D | | |
| 15. | P | Z | 12 18 23 |
| | 35.4 N., 27.8 E. | | |
| | Dodecanese Is. | | |
| | h: 32 km. | | |
| | H= 12 05 55.5 | | USCGS |
| 15. | iP Z, P N | | 14 34 59.4 |
| | S | NE | 35 25 |
| | P: D | | |
| 15. | iP | NEZ | 14 50 24.0 |
| | S | N | 50 |
| | P: S,E,D | | |
| | 34.5 N., 140.2 E. | | |
| | Southeast of Honshu, Japan. | | |
| | h: 70 km. | | |
| | H= 14 49 43.8 | | JMA |
| 15. | P | Z | 15 08 42 |
| 15. | iP | NEZ | 16 05 45.0 |
| | S | NE | 06 11 |
| | P: S,E,D | | |
| | 34.5 N., 140.0 E. | | |
| | Southeast of Honshu, Japan. | | |
| | h: 70 km. | | |
| | H= 16 05 08.6 | | JMA |
| 15. | P | NZ | 17 31 18 |
| | 43.4 N., 147.4 E. | | |
| | Kurile Is. | | |
| | h: N. | | |
| | H= 17 28 54.0 | | USCGS |
| 15. | iP | NEZ | 17 34 19.6 |
| | S | N | 45 |
| | P: S,E,D | | |
| | 34.5 N., 140.0 E. | | |
| | Southeast of Honshu, Japan. | | |
| | h: 70 km. | | |
| | H= 17 33 43.2 | | JMA |

| Date | Phase | Comp. | Time(GMT) h m s |
|---|---|---|---|
| 15. | iP | NEZ | 18 20 16.8 |
| | S | NE | 44 |
| | P: S,E,D | | |
| | 34.5 N., 140.0 E. | | |
| | Southeast of Honshu, Japan. | | |
| | h: 70 km. | | |
| | H= 18 19 40.4 | | JMA |
| 15. | iP | NEZ | 18 33 30.2 |
| | S | E | 56 |
| | P: S,E,D | | |
| 15. | P | NEZ | 20 49 09 |
| | 34.6 N., 70.9 E. | | |
| | Afghanistan. | | |
| | h: 22 km. | | |
| | H= 20 39 45.8 | | USCGS |
| 15. | iPKP1 | Z | 21 02 27.0 |
| | PKP 2 | Z | 41.5 |
| | ePPP | Z | 06 50 |
| | ePS | Z | 14 08 |
| | SS | NE | 20 50 |
| | SSS | E | 25 38 |
| | eX | N | 29 06 |
| | eX | E | 33 00 |
| | L | N | 36 00 ca. |
| | L | E | 37 00 ca. |
| | L | Z | 42 20 |
| | P: C | | |
| | Mag. 6 - 6¼ (Mat.) | | |
| | 16.8 N., 61.3 W. | | |
| | Leeward Is. | | |
| | h: 50 km. | | |
| | H= 20 43 33.4 | | USCGS |
| 15. | P | Z | 22 46 10 |
| | iX | NZ | 11.0 |
| | PP | Z | 47 31 |
| | PPP | Z | 48 03 |
| | iScP | Z | 50 52.0 |
| | S | E | 52 13 |
| | eX | E | 54 56 |
| | 7.2 S., 120.3 E. | | |
| | Flores Sea. | | |
| | h: 463 km. | | |
| | H= 22 38 23.2 | | USCGS |
| 15. | iP | Z | 23 55 29.6 |
| 16. | P | NZ | 02 05 35 |
| 16. | P | NZ | 02 15 19 |
| | iX | Z | 33.2 |
| | eS | Z | 46 |
| | 39.5 N., 141.5 E. | | |
| | North of Honshu, Japan. | | |
| | h: 80 km. | | |
| | H= 02 14 14.7 | | JMA |

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| Date | Phase | Comp. | Time(GMT) h m s |
|---|---|---|---|
| 16. | P | Z | 04 11 13 |
| | 49.8 N., 78.1 E. | | |
| | Eastern Kazakh, SSR. | | |
| | h: 0 km. | | |
| | H= 04 02 57.1 | | USCGS |
| 16. | P | Z | 04 34 39 |
| 16. | P | Z | 05 21 43 |
| | 34.9 N., 24.4 E. | | |
| | Crete. | | |
| | h: 33 km. | | |
| | H= 05 09 32.7 | | USCGS |
| 16. | iP | NEZ | 05 22 28.6 |
| | iS | NE | 44.8 |
| | P: S,E,D | | |
| 16. | iP | NEZ | 06 57 50.0 |
| | iX | E | 50.6 |
| | S | NEZ | 58 46 |
| | P: S,W,D | | |
| | 32.6 N., 136.5 E. | | |
| | Southeast of Honshu, Japan. | | |
| | h: 400 km. | | |
| | H= 06 56 39.6 | | JMA |
| 16. | iP | NEZ | 07 15 08.5 |
| | S | NE | 24 52 |
| | SS | NE | 30 04 |
| | L | N | 35 10 |
| | L | E | 20 |
| | L | Z | 38 35 |
| | P: N,W,C | | |
| | Mag. 5¾ - 6 (Mat.) | | |
| | 27.5 S., 176.6 W. | | |
| | Kermadec Is. | | |
| | h: 50 km. | | |
| | H= 07 03 22.2 | | USCGS |
| 16. | P | Z | 07 39 31 |
| | 39.2 N., 21.8 E. | | |
| | Greece. | | |
| | h: 20 km. | | |
| | H= 07 26 58.7 | | USCGS |
| 16. | P | NEZ | 11 13 43 |
| | eS | E | 14 09 |
| 16. | iP | NEZ | 11 45 51.5 |
| | S | E | 46 18 |
| | P: S,E,D | | |
| 16. | iP | NEZ | 14 16 19.6 |
| | S | NE | 46 |
| | P: S,E,D | | |
| 16. | P | NEZ | 14 50 15 |
| | S | E | 50 41 |

| Date | Phase | Comp. | Time(GMT) h m s |
|---|---|---|---|
| 16. | iP | Z | 14 52 29.6 |
| | S | E | 56 |
| | P: D | | |
| 16. | P | Z | 15 36 59 |
| | S | E | 37 25 |
| 16. | P | Z | 15 38 42 |
| | S | E | 39 08 |
| 16. | P | Z | 16 27 49 |
| | eS | E | 35 40 |
| | eLq | E | 39 35 |
| | Lr | Z | 44 18 |
| | Lr | E | 35 |
| | 0.5 S., 99.4 E. | | |
| | Southern Sumatra. | | |
| | h: 50 km. | | |
| | H= 16 18 46.8 | | USCGS |
| 16. | P | NEZ | 20 17 40 |
| 16. | iP | NEZ | 20 37 04.6 |
| | S | NE | 30 |
| | P: S,E,D | | |
| | 34.5 N., 139.6 E. | | |
| | Southeast of Honshu, Japan. | | |
| | h: 70 km. | | |
| | H= 20 36 28.4 | | JMA |
| 16. | iP | Z | 23 28 51.0 |
| | S | NE | 29 17 |
| | P: D | | |
| 16. | P | NEZ | 23 41 20 |
| | S | E | 42 08 |
| 17. | iP | NEZ | 04 32 31.7 |
| | S | NEZ | 58 |
| | P: S,E,D | | |
| 17. | iP | Z | 08 22 46.4 |
| | S | E | 23 12 |
| | P: D | | |
| 17 | P | Z | 08 59 54 |
| 17. | iP | Z | 09 07 30.0 |
| | P: C | | |
| 17. | P | EZ | 10 30 29 |
| | iX | EZ | 44 |
| | 35.3 N., 140.5 E. | | |
| | Southeast of Honshu, Japan. | | |
| | h: 30 km. | | |
| | H= 10 29 50.2 | | JMA |
| 17. | iP | EZ | 11 16 23.8 |
| | P: W,C | | |

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| Date | Phase | Comp. | Time(GMT) h m s |
|---|---|---|---|
| 17. | iP | EZ | 11 41 08.5 |
| | iS | E | 33.5 |
| | P: E,D | | |
| 17. | iP | NEZ | 14 05 18.0 |
| | iS | N | 52.6 |
| | P: S,W,C | | |
| 17. | iP | NEZ | 18 31 36.7 |
| | iS | E | 32 02.8 |
| | P: S,E,D | | |
| | 34.5 N., 140.2 E. | | |
| | Southeast of Honshu, Japan. | | |
| | h: 70 km. | | |
| | H= 18 30 57.1 | | JMA |
| 17. | iP | Z | 19 35 21.5 |
| | eS | NE | 48 |
| | P: D | | |
| 17. | iP Z, P NE | | 22 20 25.0 |
| | S | E | 39 |
| | P: D | | |
| | 36.3 N., 140.3 E. | | |
| | Southeast of Honshu, Japan. | | |
| | h: 70 km. | | |
| | H= 22 19 51.6 | | JMA |
| 17. | iP Z, P NE | | 23 19 36.5 |
| | S | N | 20 00 |
| | P: D | | |
| 17. | iP | NEZ | 23 38 04.0 |
| | iS | E | 29.5 |
| | P: S,E,D | | |
| 18. | eP | Z | 00 24 20 |
| | S | NE | 31 24 |
| | ScS | E | 34 24 |
| | SS | N | 35 12 |
| | Mag. $5\frac{3}{4}$ - 6 (Mat.) | | |
| | 9.0 S., 158.4 E. | | |
| | Solomon Is. | | |
| | h: 16 km. | | |
| | H= 00 15 31.5 | | USCGS |
| 18. | P | Z | 01 00 18 |
| | S | N | 40 |
| 18. | P | Z | 01 02 46 |
| | S | N | 03 14 |
| 18. | P | Z | 03 09 19 |
| 18. | iP | NEZ | 08 37 36.4 |
| | S | N | 38 02.6 |
| | P: S,E,D | | |

| Date | Phase | Comp. | Time(GMT) h m s |
|---|---|---|---|
| 18. | iP | NEZ | 08 53 17.0 |
| | S | Z | 09 00 40 |
| | P: S,W,C | | |
| | 60.3 N., 146.0 W. | | |
| | Southern Alaska. | | |
| | h: 6 km. | | |
| | H= 08 44 03.6 | | USCGS |
| 18. | eP | Z | 09 17 20 |
| | S | N | 44 |
| 18. | P | Z | 09 52 16 |
| | 2.3 N., 128.7 E. | | |
| | Halmahera. | | |
| | h: 113 km. | | |
| | H= 09 45 34.0 | | USCGS |
| 18. | P | Z | 11 30 36 |
| | eS | N | 31 30 |
| 18. | eP | Z | 13 42 44 |
| 18. | iP Z, P NE | | 18 02 14.5 |
| | S | N | 42 |
| | P: D | | |
| 18. | iP Z, P N | | 18 03 16.0 |
| | S | NE | 42 |
| | P: D | | |
| 18. | P | NZ | 20 34 13 |
| | S | NE | 39 |
| 18. | iP Z, P NE | | 20 57 50.0 |
| | S | E | 59 10 |
| | iX | N | 14 |
| | P: C | | |
| | 41.2 N., 142.3 E. | | |
| | Hokkaido, Japan. | | |
| | h: 40 km. | | |
| | H= 20 56 22.9 | | JMA |
| 18. | P | Z | 21 34 13 |
| | eS | E | 35 03 |
| 18. | iP | NEZ | 22 02 21.6 |
| | S | NE | 48 |
| | P: S,E,D | | |
| | 34.5 N., 139.6 E. | | |
| | Near south coast of Honshu, Japan. | | |
| | h: 70 km. | | |
| | H= 22 01 46.0 | | JMA |
| 18. | iP Z, P NE | | 22 59 12.5 |
| | S | E | 23 00 00 |
| | P: D | | |
| | 33.0 N., 141.4 E. | | |

(cont.)

| Date | Phase | Comp. | Time(GMT) h m s |
|---|---|---|---|
| | Off east coast of Honshu, Japan. h: 41 km. H= 22 58 05.4 | | USCGS |
| 18 | P | NEZ | 23 14 32 |
| | S | N | 15 25 |
| 19 | P | Z | 01 29 41 |
| | S | NE | 30 07 |
| 19 | iP | Z | 02 32 07.3 |
| | eS | N | 33 29 |
| | P: C | | |
| 19 | P | Z | 02 34 12.0 |
| | S | E | 38 |
| 19 | iP | Z | 03 45 24.5 |
| | S | NE | 50 |
| | P: C | | |
| 19 | iP | NEZ | 03 55 33.6 |
| | S | EZ | 59 |
| | P: S,E,D | | |
| | 34.5N., 140.0E Near south coast of Honshu, Japan h: 70 km H= 03 54 57.6 | | JMA |
| 19 | iP | NZ | 04 08 15.3 |
| | S | E | 40 |
| | P: N,C | | |
| 19 | iP | NEZ | 04 18 04.3 |
| | iS | NE | 29.7 |
| | P: S,E,D | | |
| | 34.6N., 140.0E Near south coast of Honshu, Japan h: 70 km H= 04 17 28.1 | | JMA |
| 19 | P | Z | 05 14 33 |
| 19 | iP | NEZ | 07 48 59.9 |
| | iS | E | 49 25.6 |
| | P: S,E,D | | |
| | 34.5N., 139.5E Near south coast of Honshu, Japan h: 70 km H= 07 48 23.5 | | JMA |
| 19 | iP | Z | 10 13 52.6 |
| | S | N | 14 19 |
| | P: C | | |
| 19 | P | Z | 10 50 47 |
| | S | E | 51 37 |
| 19 | iPZ | PNE | 13 14 26.5 |
| | S | NEZ | 59 |
| | P: C | | |
| 19 | iP | NEZ | 13 56 11.2 |
| | iS | NE | 36.8 |
| | P: S,E,D | | |
| 19 | P | Z | 17 37 44 |
| | S | E | 38 10 |
| 19 | P | Z | 19 40 07 |
| | S | NE | 31 |
| 19 | P | Z | 19 47 59 |
| 20 | P | Z | 03 49 42 |
| | pP | Z | 50 29 |
| | 3.0N., 128.6E North of Halmahera h: 217 km H= 03 43 13.1 | | USCGS |
| 20 | iP | NEZ | 06 36 51.8 |
| | S | N | 37 32 |
| | S | E | 33 |
| | P: S,W,C | | |
| | 38.2N., 141.5E Near east coast of Honshu, Japan h: 60 km H= 06 35 58.8 | | JMA |
| 20 | iPZ | PE | 07 13 20.5 |
| | iX | Z | 21.9 |
| | S | N | 54 |
| | P: D | | |
| | 35.3N., 140.5E South-east of Honshu, Japan h: 50 km H= 07 12 41.7 | | JMA |
| 20 | P | NEZ | 10 07 16 |
| | S | E | 41 |
| 20 | P | Z | 14 09 58 |
| | S | E | 10 23 |
| 20 | iPNZ | PE | 14 23 09.5 |
| | eS | N | 24 42 |
| | P: N,D | | |
| | 40.6N., 141.6E Hokkaido, Japan h: 50 km H= 14 21 49.7 | | JMA |

| Date | Phase | Comp. | Time(GMT) h m s |
|---|---|---|---|
| 20 | iPZ | PNE | 15 02 02.7 |
| | eS | E | 03 55 |
| | P: C | | |
| | 43.3N., 147.2E | | |
| | Kurile Is. | | |
| | h: 0 km | | |
| | H= 14 59 40.3 | | JMA |
| 20. | iP | NEZ | 15 06 28.2 |
| | iS | NE | 52.5 |
| | P S,E,D | | |
| | 34.5 N., 139.3 E. | | |
| | Near south coast of Honshu, Japan. | | |
| | h: 100 km. | | |
| | H= 15 05 54.7 | | JMA |
| 20. | eP | Z | 15 59 48 |
| 20. | P | Z | 17 52 53 |
| | S | E | 53 21 |
| 20. | eP | Z | 19 28 25 |
| | 19.6 S., 66.2 E. | | |
| | Mascarene Is. region. | | |
| | h: N. | | |
| | H= 19 15 37.2 | | USCGS |
| 20. | iP | EZ | 19 29 09.8 |
| | S | E | 35 |
| | P: W,D | | |
| 20. | P | NEZ | 22 14 08 |
| 20. | iP | NEZ | 22 16 21.5 |
| | S | NE | 48 |
| | P: S,E,D | | |
| 21. | P | NEZ | 01 56 34 |
| | S | NE | 57 01 |
| 21. | iP | NZ | 03 00 33.2 |
| | S | NE | 59 |
| | P: N,C | | |
| 21. | eP | Z | 03 02 28 |
| | eX | EZ | 06 24 |
| | S | N | 56 |
| | eL | NE | 08 00 |
| | 11.7 N., 125.8 E. | | |
| | Samar, P.I. | | |
| | h: 26 km. | | |
| | H= 02 56 49.2 | | USCGS |
| 21. | iP | Z | 04 26 47.5 |
| | S | NE | 27 14 |
| | P: D | | |

| Date | Phase | Comp. | Time(GMT) h m s |
|---|---|---|---|
| 21. | P | NZ | 04 34 34 |
| | eX | N | 35 47 |
| 21. | P | NZ | 08 45 04 |
| | eX | N | 30 |
| | eX | N | 46 40 |
| | 41.4 N., 142.1 E. | | |
| | Near east coast of Honshu, Japan. | | |
| | h: 20 km. | | |
| | H= 08 43 36.5 | | JMA |
| 21. | iP | NEZ | 09 09 17.7 |
| | iX | Z | 29.4 |
| | iX | N | 29.8 |
| | S | NEZ | 44 |
| | P: S,E,D | | |
| 21. | eP | Z | 10 14 56 |
| 21. | iP | Z | 12 13 31.0 |
| | S | N | 56 |
| | S | E | 57 |
| 21. | iP | Z | 15 40 58.9 |
| | P: C | | |
| | 36.4 N., 70.2 E. | | |
| | Hindu-Kush region. | | |
| | h: 229 km. | | |
| | H= 15 31 59.9 | | USCGS |
| 21. | iP | NEZ | 15 46 33.7 |
| | iX | NZ | 43.4 |
| | X | Z | 56 |
| | S | N | 47 08 |
| | X | NEZ | 21 |
| | P: S,W,D | | |
| | 34.4 N., 135.9 E. | | |
| | Central Honshu, Japan. | | |
| | h: 40 km. | | |
| | H= 15 45 50.7 | | JMA |
| 21. | P | NEZ | 21 48 02 |
| | eS | E | 50 08 |
| | eX | E | 40 |
| | eL | Z | 51 12 |
| | 44.0 N., 149.6 E. | | |
| | Kurile Is. | | |
| | h: 40 km. | | |
| | H= 21 45 19.2 | | USCGS |
| 21. | P | EZ | 23 02 44 |
| | S | NE | 03 11 |
| 22. | iP | EZ | 04 07 58.4 |
| | P: E,D | | |
| 22. | iP | EZ | 04 57 14.5 |

(cont.)

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| Date | Phase | Comp. | Time(GMT) h m s |
|---|---|---|---|
| | iX | Z | 04 57 25.6 |
| | S | NEZ | 40 |
| | P: W,C | | |
| 22. | P | EZ | 05 33 31 |
| | iX | N | 32.7 |
| | iX | E | 35 |
| | S | NEZ | 56 |
| 22. | iP | Z | 08 06 44.4 |
| | X | Z | 58 |
| | eX | E | 08 28 |
| | eX | N | 34 |
| | P: C | | |
| 22. | iP | EZ | 09 37 48.9 |
| | X | N | 56 |
| | eX | E | 38 58 |
| | X | N | 39 04 |
| | X | Z | 08 |
| | P: W,C | | |
| | 38.2 N., 143.6 E. | | |
| | Off east coast of Honshu, | | |
| | Japan. | | |
| | h: 0 km. | | |
| | H= 09 36 34.6 | | JMA |
| 22. | iP | EZ | 11 41 20.5 |
| | iX | EZ | 21.0 |
| | iX | N | 21.3 |
| | iX | EZ | 36 |
| | eS | NE | 45 |
| | P: E,D | | |
| | 36.5 N., 140.6 E. | | |
| | Near east coast of Honshu, | | |
| | Japan. | | |
| | h: 50 km. | | |
| | H= 11 40 49.4 | | JMA |
| 22. | P | Z | 15 04 41.7 |
| | S | N | 05 08 |
| 22. | P | NEZ | 15 06 05 |
| 22. | iP | EZ | 19 20 01.8 |
| | P: W,C | | |
| 22. | iP | Z | 19 56 58.2 |
| | eS | E | 57 21 |
| | P: D | | |
| 22. | iP | NEZ | 20 27 18.0 |
| | iX | N | 27.8 |
| | S | NEZ | 42 |
| | P: S,E,C | | |
| 22. | P | Z | 20 59 26 |
| | X | Z | 44 |
| | | | (cont.) |



| Date | Phase | Comp. | Time(GMT) h m s |
|---|---|---|---|
| | 53.2 N., 162.6 E. | | |
| | Off east coast of Kamchatka. | | |
| | h: 54 km. | | |
| | H= 20 54 16.3 | | USCGS |
| 22. | iP | Z | 21 22 08.6 |
| | iX | E | 18.6 |
| | S | NE | 32 |
| | iS | Z | 32.9 |
| 22. | iP | Z | 21 36 45.7 |
| | S | NE | 38 28 |
| | iX | EZ | 29.0 |
| | P: D | | |
| | 27.4 N., 140.1 E. | | |
| | Bonin Is. region. | | |
| | h: 395 km. | | |
| | H= 21 34 34.6 | | USCGS |
| 22. | iP | Z | 22 39 43.1 |
| | eL | N | 23 00 20 |
| | P: D | | |
| | 5.7 S., 103.2 E. | | |
| | Southern Sumatra. | | |
| | h: 68 km. | | |
| | H= 22 30 29.8 | | USCGS |
| 23. | P | Z | 11 34 16 |
| | S | N | 35 54 |
| | X | E | 36 00 |
| 23. | iP | Z | 12 33 04.7 |
| | eS | E | 31 |
| | P: D | | |
| 23. | P | Z | 13 12 52 |
| | eX | E | 18 44 |
| | eS | N | 19 28 |
| | L | E | 22 48 |
| | L | N | 56 |
| | P: D | | |
| | 53.4 N., 160.2 W. | | |
| | South of Alaska. | | |
| | h: 32 km. | | |
| | H= 13 04 36.6 | | USCGS |
| 23. | iP | Z | 14 32 29.1 |
| | S | E | 55 |
| | P: D | | |
| 23. | P | Z | 14 42 03 |
| | 39.7 S., 175.6 E. | | |
| | North I., New Zealand. | | |
| | h: 70 km. | | |
| | H= 14 29 43.1 | | USCGS |
| 23. | iP | NEZ | 15 26 12.5 |
| | S | E | 39 |
| | P: S,E,D | | |

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| Date | Phase | Comp. | Time(GMT) h m s |
|---|---|---|---|
| 23. | iP | Z | 15 52 37.0 |
| | eS | N | 54 07 |
| | L | N | 38 |
| | L | E | 42 |
| | L | Z | 50 |
| | P: C | | |
| | 29.4 N., 142.2 E. | | |
| | South of Honshu, Japan. | | |
| | h: 43 km. | | |
| | H= 15 50 42.5 | | USCGS |
| 23. | iP | Z | 16 17 32.7 |
| | eS | N | 22 40 |
| | L | E | 24 10 |
| | L | Z | 44 |
| | P: C | | |
| | 7.4 N., 126.8 E. | | |
| | Mindanao, P.I. | | |
| | h: 66 km. | | |
| | H= 16 11 21.4 | | USCGS |
| 23. | P | Z | 16 23 44.8 |
| | eS | E | 24 49 |
| | 29.6 N., 142.6 E. | | |
| | South of Honshu, Japan. | | |
| | h: N. | | |
| | H= 16 21 50.0 | | USCGS |
| 23. | P | Z | 17 16 41 |
| | X | Z | 17 58 |
| | eL | E | 33 12 |
| | eL | Z | 22 |
| | eL | N | 50 |
| | 3.7 N., 95.7 E. | | |
| | Off west coast of Northern Sumatra. | | |
| | h: 47 km. | | |
| | H= 17 07 42.2 | | USCGS |
| 23. | iP | EZ | 18 36 26.4 |
| | S | N | 45 |
| | P: E,D | | |
| 23. | iP | Z | 21 33 44.8 |
| | eS | N | 34 10 |
| | P: C | | |
| 23. | iP | NEZ | 23 04 28.2 |
| | S | Z | 44 |
| | X | N | 46 |
| | P: S,E,D | | |
| | 36.1 N., 139.9 E. | | |
| | Southeast of Honshu, Japan. | | |
| | h: 60 km. | | |
| | H= 23 04 03.8 | | JMA |
| 24. | iP | NZ | 02 42 48.4 |
| | S | N | 43 23 |
| | S | EZ | 24 |
| | P: N,C | | |

| Date | Phase | Comp. | Time(GMT) h m s |
|---|---|---|---|
| 24. | P | Z | 03 37 27 |
| | 4.0 N., 127.9 E. | | |
| | Talaud Is. | | |
| | h: 84 km. | | |
| | H= 03 30 53.8 | | USCGS |
| 24. | P | NZ | 05 06 36 |
| | eX | E | 08 10 |
| | eX | E | 09 10 |
| | eX | N | 16 |
| | 29.2 N., 142.2 E. | | |
| | South of Honshu, Japan. | | |
| | h: N. | | |
| | H= 05 04 38.3 | | USCGS |
| 24. | P | EZ | 05 30 20 |
| | eX | N | 50 |
| 24. | iP | Z | 07 05 32.6 |
| | S | N | 06 09 |
| | S | EZ | 10 |
| | P: C | | |
| 24. | P | Z | 11 38 36 |
| | S | NE | 40 05 |
| 24. | iP | NEZ | 16 36 33.8 |
| | P: S,E,D | | |
| | 10.1 S., 161.3 E. | | |
| | Solomon Is. | | |
| | h: 96 km. | | |
| | H= 16 27 39.4 | | USCGS |
| 24. | iP | NEZ | 20 05 50.0 |
| | S | E | 06 16 |
| | P: S,E,D | | |
| 24. | iP | Z | 20 07 42.2 |
| | S | EZ | 09 11 |
| | X | N | 13 |
| | L | N | 46 |
| | L | E | 48 |
| | P: C | | |
| | 30.3 N., 143.0 E. | | |
| | South of Honshu, Japan. | | |
| | h: 47 km. | | |
| | H= 20 05 54.0 | | USCGS |
| 24. | eP | Z | 23 56 20 |
| 25. | iP | EZ | 00 47 53.2 |
| | iX | N | 53.4 |
| | P: W,C | | |
| 25. | P | Z | 15 06 43 |
| 25. | P | Z | 20 30 27 |
| | 32.0 S., 178.8 W. | | |
| | South of Kermadec Is. | | |

(cont.)

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| Date | Phase | Comp. | Time(GMT) h m s |
|---|---|---|---|
| | h: 70 km. | | |
| | H= 20 18 30.0 | | USCGS |
| 26. | P | Z | 01 33 25 |
| | 7.0 S., 129.6 E. | | |
| | Banda Sea. | | |
| | h: 115 km. | | |
| | H= 01 25 28.3 | | USCGS |
| 26. | iP | NEZ | 13 33 14.5 |
| | S | NE | 40 |
| | P: S,E,D | | |
| 26. | eP | Z | 15 43 02 |
| | eX | Z | 46 48 |
| | X | E | 56 |
| | eS | N | 47 16 |
| | L | E | 48 36 |
| | eL | Z | 49 08 |
| | 11.8 N., 125.8 E. | | |
| | Samar, P.I. | | |
| | h: 14 km. | | |
| | H= 15 37 16.8 | | USCGS |
| 26. | iP | Z | 20 58 56.6 |
| | iS | N | 59 10.3 |
| | P: C | | |
| 26. | eP | Z | 23 45 37 |
| 27. | P | Z | 03 12 17 |
| 27. | eP | Z | 04 11 10 |
| 27. | eP | EZ | 05 15 35 |
| 27. | iP | NEZ | 06 07 18.5 |
| | S | NE | 44 |
| | P: S,E,D | | |
| 27. | eP | Z | 08 15 34 |
| 27. | iP | NEZ | 09 34 24.5 |
| | PcP | Z | 36 38 |
| | eL | NEZ | 43 20 |
| | P: N,E,C | | |
| | 0.2 S., 125.0 E. | | |
| | Molucca Sea. | | |
| | h: N. | | |
| | H= 09 27 03.8 | | USCGS |
| 27. | eP | Z | 11 50 09 |
| | X | NE | 12 |
| | 21.7 N., 143.0 E. | | |
| | Mariana Is. region. | | |
| | h: 309 km. | | |
| | H= 11 46 46.1 | | USCGS |
| 27. | eX | EZ | 11 52 11 |
| | eX | E | 54 |
| | X | N | 55 |
| | X | Z | 57 |
| 27. | ePKP | Z | 12 38 48 |
| | 59.9 S., 26.5 W. | | |
| | South Sandwich Is. region. | | |
| | h: 19 km. | | |
| | H= 12 18 45.6 | | USCGS |
| 27. | P | EZ | 12 45 10 |
| | X | NZ | 20 |
| | eS | E | 47 |
| 27. | iP NZ, P | E | 15 10 41.2 |
| | eS | E | 18 12 |
| | eL | E | 23 14 |
| | P: S,C | | |
| | 10.7 S., 164.4 E. | | |
| | Santa Cruz Is. region. | | |
| | h: 8 km. | | |
| | H= 15 01 21.9 | | USCGS |
| 27. | P | EZ | 16 38 01 |
| | X | Z | 30 |
| | 8.8 S., 124.1 E. | | |
| | Timor. | | |
| | h: 30 km. | | |
| | H= 16 29 30.5 | | USCGS |
| 27. | P | NEZ | 20 55 16 |
| | eS | N | 57 31 |
| | 44.5 N., 148.6 E. | | |
| | Kurile Is. | | |
| | h: 18 km. | | |
| | H= 20 52 34.1 | | USCGS |
| 27. | eX | EZ | 23 01 23 |
| | eX | N | 02 00 |
| 28. | iP | Z | 01 30 30.3 |
| | eS | NEZ | 57 |
| | P: D | | |
| 28. | eP | Z | 03 46 46 |
| | eS | N | 50 38 |
| | eL | Z | 51 48 |
| | eL | E | 52 20 |
| | 11.8 N., 125.8 E. | | |
| | Samar, P.I. | | |
| | h: 6 km. | | |
| | H= 03 41 01.8 | | USCGS |
| 28. | P | Z | 13 17 10 |
| | X | Z | 18 09 |
| | PcP | Z | 29 |
| | 10.9 S., 118.4 E. | | |



(cont.)

| Date | Phase | Comp. | Time(GMT) h m s | |
|---|---|---|---|---|
| | South of Sumbawa I. | | | |
| | h: 17 km. | | | |
| | H= 13 08 10.0 | | | USCGS |
| 28. | eP | Z | 13 48 51 | |
| | X | Z | 49 03 | |
| | eX | Z | 45 | |
| 28. | P | Z | 13 52 19 | |
| | X | Z | 53 35 | |
| | eX | Z | 14 03 08 | |
| | X | NE | 09 10 | |
| 28. | eP | NZ | 15 31 41 | |
| | S | N | 32 47 | |
| 28. | iP | NEZ | 17 15 46.6 | |
| | S | E | 17 42 | |
| | P: S,W,C | | | |
| | 44.9 N., 147.7 E. | | | |
| | Kurile Is. | | | |
| | h: 90 km. | | | |
| | H= 17 13 13.3 | | | JMA |
| 28. | iP | NZ | 19 53 27.6 | |
| | iX | E | 28.6 | |
| | iX | E | 48.3 | |
| | S | NE | 54 17 | |
| | P: N,C | | | |
| | 32.6 N., 138.4 E. | | | |
| | South of Honshu, Japan. | | | |
| | h: 295 km. | | | |
| | H= 19 52 22.6 | | | USCGS |
| 28. | iP | Z | 22 26 48.0 | |
| | iX | NEZ | 49.1 | |
| | eX | E | 28 03 | |
| | P: C | | | |
| | 40.1 N., 142.1 E. | | | |
| | Near east coast of Honshu, Japan. | | | |
| | h: 40 km. | | | |
| | H= 22 25 37.3 | | | JMA |
| 28. | iP Z, P NE | | 23 44 25.0 | |
| | X | Z | 31 | |
| | eS | E | 45 24 | |
| | eX | N | 26 | |
| | P: C | | | |
| 29. | P | EZ | 07 28 29 | |
| | eS | E | 37 32 | |
| | eS | N | 34 | |
| | eL | E | 48 36 | |
| | eL | N | 40 | |
| | eL | Z | 50 | |
| | 15.0 S., 173.3 W. | | | |
| | Tonga Is. | | | |
| | h: 33 km. | | | (cont.) |

| Date | Phase | Comp. | Time(GMT) h m s | |
|---|---|---|---|---|
| | H= 07 17 26.8 | | | USCGS |
| 29. | eP | Z | 08 43 44 | |
| | eS | E | 47 52 | |
| | 15.7 N., 147.3 E. | | | |
| | Mariana Is. region. | | | |
| | h: 14 km. | | | |
| | H= 08 38 46.8 | | | USCGS |
| 29. | iP | Z | 10 33 00.6 | |
| | iX | N | 00.8 | |
| | P: D | | | |
| | 20.3 S., 177.7 W. | | | |
| | Fiji Is. region. | | | |
| | h: 510 km. | | | |
| | H= 10 22 38.0 | | | USCGS |
| 29. | eP | NZ | 11 32 57 | |
| | 20.2 S., 177.7 W. | | | |
| | Fiji Is. region. | | | |
| | h: 510 km. | | | |
| | H= 11 22 35.0 | | | USCGS |
| 29. | iP | NEZ | 13 17 38.5 | |
| | X | E | 18 55 | |
| | eX | N | 19 00 | |
| | X | Z | 19 09 | |
| | P: S,W,C | | | |
| | 39.8 N., 143.3 E. | | | |
| | Off east coast of Honshu, Japan. | | | |
| | h: 10 km. | | | |
| | H= 13 16 17.5 | | | JMA |
| 29. | iP | NEZ | 13 47 22.4 | |
| | X | E | 48 48 | |
| | P: S,W,C | | | |
| | 39.8 N., 143.5 E. | | | |
| | Off east coast of Honshu, Japan. | | | |
| | h: 30 km. | | | |
| | H= 13 46 01.4 | | | JMA |
| 29. | P | NEZ | 16 28 55 | |
| | 29.4 S., 178.8 W. | | | |
| | Kermadec Is. region. | | | |
| | h: 306 km. | | | |
| | H= 16 17 35.1 | | | USCGS |
| 29. | iP | Z | 17 03 52.1 | |
| | P: C | | | |
| | 19.9 S., 174.7 W. | | | |
| | Tonga Is. | | | |
| | h: N. | | | |
| | H= 16 52 32.1 | | | USCGS |
| 29. | P | NZ | 22 16 04 | |
| | S | E | 24 | |

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| Date | Phase | Comp. | Time(GMT) h m s |
|---|---|---|---|
| 30. | iP Z, P E | | 00 56 47.2 |
| | eS | NE | 57 13 |
| | P: E,D | | |
| 30. | P | EZ | 03 30 33 |
| 30. | P | Z | 06 05 29.5 |
| | X | Z | 06 53 |
| | eS | N | 13 06 |
| | P: C | | |
| | 9.7 S., 118.7 E. | | |
| | Sumbawa I. region. | | |
| | h: 7 km. | | |
| | H= 05 56 37.8 | | USCGS |
| 30. | P | Z | 06 58 19 |
| 30. | P | Z | 10 03 09 |
| | 16.1 S., 168.1 E. | | |
| | New Hebrides Is. | | |
| | h: 184 km. | | |
| | H= 09 53 24.2 | | USCGS |
| 30. | iP | Z | 11 55 58.4 |
| | eS | NEZ | 56 20 |
| | P: D | | |
| | 37.3 N., 141.1 E. | | |
| | Near east coast of Honshu, Japan. | | |
| | h: 100 km. | | |
| | H= 11 55 16.2 | | JMA |
| 30. | P | Z | 16 07 41 |
| | S | NZ | 17 40 |
| | X | E | 46 |
| | eX | N | 22 28 |
| | L | E | 29 04 |
| | L | N | 10 |
| | Mag. $6\frac{1}{4}$ - $6\frac{1}{2}$ (Mat.) | | |
| | 32.2 S., 178.1 W. | | |
| | South of Kermadec Is. | | |
| | h: 34 km. | | |
| | H= 15 55 37.1 | | USCGS |
| 30. | P | Z | 16 34 51 |
| | X | Z | 52 |
| | eS | N | 44 38 |
| | eX | Z | 46 |
| | eX | E | 45 24 |
| | L | E | 56 12 |
| | Lr | Z | 17 02.4 |
| | Lr | E | 03 06 |
| | Mag. $6\frac{1}{2}$ (Mat.) | | |
| | 32.3 S., 178.1 W. | | |
| | South of Kermadec Is. | | |
| | h: N. | | |
| | H= 16 22 47.8 | | USCGS |
| 30. | iP | NEZ | 18 57 21.5 |
| | S | NEZ | 40 |
| | P: C | | |
| 30. | P | Z | 23 27 35 |
| | 7.0 S., 129.8 E. | | |
| | Banda Sea. | | |
| | h: 104 km. | | |
| | H= 23 19 37.7 | | USCGS |
| 31. | iP | NEZ | 00 04 42.5 |
| | S | N | 48 |
| | P: N,E | | |
| 31. | iP | EZ | 10 45 36.5 |
| | iX | Z | 48.3 |
| | X | NE | 50 |
| | S | N | 46 34 |
| | P: W,D | | |
| | 34.0 N., 135.1 E. | | |
| | Central Honshu, Japan. | | |
| | h: 10 km. | | |
| | H= 10 44 38.6 | | JMA |
| 31. | iP | NEZ | 11 18 36.0 |
| | iX | N | 42.4 |
| | iX | EZ | 42.6 |
| | P: N,E,D | | |
| 31. | iP | Z | 11 26 12.1 |
| | P: C | | |
| 31. | P | Z | 13 32 20 |
| 31. | iP | Z | 14 10 12.5 |
| | iX | N | 12.8 |
| | S | NE | 55 |
| | P: D | | |
| 31. | iP EZ, P N | | 14 13 07.3 |
| | S | N | 26 |
| | S | E | 27 |
| | P: E,D | | |
| | 35.9 N., 139.8 E. | | |
| | Southeast of Honshu, Japan. | | |
| | h: 70 km. | | |
| | H= 14 12 42.7 | | JMA |
| 31. | P | Z | 22 08 49 |
| | epP | Z | 09 23 |
| | 36.3 N., 70.9 E. | | |
| | Hindu-Kush region. | | |
| | h: 134 km. | | |
| | H= 21 59 41.9 | | USCGS |
| 31. | eP | EZ | 22 35 46 |
| | eS | N | 44 46 |
| | eL | E | 52 50 |

(cont.)

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| Date | Phase | Comp. | Time(GMT) h m s | Date | Phase | Comp. | Time(GMT) h m s |
|---|---|---|---|---|---|---|---|
| | L | N | 22 53 28 | | | | |
| | eL | Z | 56 20 | | | | |

Mag. 6(Mat.)
16.0 S., 172.9 W.
Samda Is. region.
h: 15 km.
H= 22 24 32.0 USCGS

Mineo Takehana
Director

June , 1969

| Date | Phase | Comp. | Time(GMT) h m s |
|---|---|---|---|
| 1. | P | NEZ | 00 03 51 |
| | PcP | Z | 05 30 |
| | ScP | Z | 08 43 |
| | S | NE | 09 46 |
| | X | N | 12 10 |
| | X | EZ | 13 06 |
| | 4.9 S., 154.2 E. | | |
| | Solomon Is. | | |
| | h: 403 km. | | |
| | H= 23 56 21.6 | | USCGS |
| 1. | iP | NZ | 01 03 09.1 |
| | S | NE | 04 29 |
| | P: S,C | | |
| | 44.0 N., 139.0 E. | | |
| | Eastern Sea of Japan. | | |
| | h: 192 km. | | |
| | H= 01 01 20.8 | | USCGS |
| 1. | P | Z | 02 00 13 |
| | iX | NZ | 13.3 |
| | S | NE | 01 56 |
| | 27.5 N., 139.8 E. | | |
| | Bonin Is. region. | | |
| | h: 482 km. | | |
| | H= 01 58 03.4 | | USCGS |
| 1. | iP Z, P E | | 09 38 38.0 |
| | S | NEZ | 54 |
| | P: D | | |
| 1. | PKP | Z | 13 35 35 |
| | eX | Z | 37 10 |
| | 16.4 S., 73.7 W. | | |
| | Near coast of Peru. | | |
| | h: 48 km. | | |
| | H= 13 15 57.1 | | USCGS |
| 1. | eP | NZ | 13 55 54 |
| | iX | Z | 56 13 |
| | S | E | 14 01 20 |
| | Lq | E | 03 14 |
| | Lr | Z | 06 36 |
| | 3.3 N., 126.6 E. | | |
| | Talaud Is. | | |
| | h: 46 km. | | |
| | H= 13 49 06.8 | | USCGS |
| 1. | eX | E | 19 19 25 |
| | iX | E | 25 10 |
| | eX | N | 36.5 |
| | eX | E | 39.7 |
| 1. | eP | Z | 20 05 16 |
| | eX | E | 39 |
| | eX | Z | 40 |
| | 31.7 S., 178.2 W. | | |
| | Kermadec Is. | | |
| | h: 17 km. | | |

(cont.)

| Date | Phase | Comp. | Time(GMT) h m s |
|---|---|---|---|
| | H= 19 53 12.4 | | USCGS |
| 1. | P | EZ | 21 24 15 |
| | S | N | 49 |
| | iX | N | 25 09 |
| | iX | N | 31 |
| 2. | P | Z | 01 50 31 |
| | iX | Z | 45 |
| | 41.3 N., 142.6 E. | | |
| | Hokkaido, Japan region. | | |
| | h: 79 km. | | |
| | H= 01 49 03.7 | | USCGS |
| 2. | P | EZ | 03 42 16 |
| | S | N | 32 |
| 2. | P | Z | 05 44 44 |
| | iX | Z | 47 |
| | iX | Z | 54 |
| | eX | Z | 45 10 |
| | eX | N | 49 13 |
| | iX | E | 34 |
| | 12.9 N., 143.4 E. | | |
| | South of Mariana Is. | | |
| | h: 127 km. | | |
| | H= 05 39 41.2 | | USCGS |
| 2. | P | Z | 08 15 14 |
| 2. | eP | Z | 09 57 16 |
| | S | E | 10 04 52 |
| | ScS | E | 07 08 |
| | eL | N | 10.7 |
| | iX | Z | 19.7 |
| 2. | P | Z | 11 10 55 |
| | S | E | 11 21 |
| 2. | P | Z | 12 10 46 |
| | iX | Z | 48 |
| | eS | NE | 11 22 |
| 2. | eP | Z | 14 16 43 |
| | S | N | 17 19 |
| 2. | P | NEZ | 14 35 46 |
| | eS | E | 36 13 |
| 2. | iP | Z | 15 55 10.8 |
| | eX | N | 39 |
| | iX | N | 48 |
| | P: D | | |
| 2. | P | Z | 16 43 59 |
| | eX | N | 44 20 |
| | S | NE | 25 |

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| Date | Phase | Comp. | Time(GMT) h m s |
|---|---|---|---|
| 2. | iP Z, P NE | | 21 57 41.6 |
| | eX | N | 58 31 |
| | P: C | | |
| | 36.6 N., 141.3 E. | | |
| | Near east coast of Honshu, Japan. | | |
| | h: 55 km. | | |
| | H= 21 57 00.7 | | USCGS |
| 3. | P | Z | 00 27 54 |
| | eX | N | 29 45 |
| | 42.8 N., 145.5 E. | | |
| | Hokkaido, Japan region. | | |
| | h: 73 km. | | |
| | H= 00 25 52.2 | | USCGS |
| 3. | P | EZ | 02 05 53 |
| | S | E | 06 24 |
| | iX | N | 29 |
| 3. | eX | N | 04 22 50 |
| | eX | N | 29 33 |
| | eL | E | 37 24 |
| | eL | Z | 42 45 |
| 3. | eP | Z | 10 45 25 |
| 3. | eX | Z | 13 36 41 |
| 3. | P | NZ | 16 23 51 |
| | iX | NEZ | 53 |
| | 41.6 N., 142.7 E. | | |
| | Near Hokkaido, Japan. | | |
| | h: 40 km. | | |
| | H= 16 22 18.0 | | JMA |
| 3. | iP | Z | 17 12 59.2 |
| | P: D | | |
| | 40.6 N., 142.7 E. | | |
| | Near Honshu, Japan. | | |
| | h: 0 km. | | |
| | H= 17 11 35.1 | | JMA |
| 3. | P | Z | 18 58 52 |
| | 49.1 N., 156.2 E. | | |
| | Kurile Is. | | |
| | h: 41 km. | | |
| | H= 18 54 41.7 | | USCGS |
| 3. | iP | NEZ | 21 54 31.5 |
| | iX | N | 55 34 |
| | P: S,W,C | | |
| | 40.2 N., 143.7 E. | | |
| | Off east coast of Hokkaido, Japan. | | |
| | h: N. | | |
| | H= 21 53 06.5 | | USCGS |
| 4. | eP | Z | 03 50 02 |

| Date | Phase | Comp. | Time(GMT) h m s |
|---|---|---|---|
| 4. | eP | Z | 04 50 50 |
| | eS | N | 05 00 47 |
| | eSS | N | 06 00 |
| | eLq | N | 12 00 |
| | eLr | Z | 15 15 |
| 4. | eP | Z | 07 06 22 |
| 4. | P | Z | 10 54 24 |
| | S | N | 55 14 |
| 4. | eP | Z | 11 48 58 |
| 4. | iP Z, P N | | 13 55 35.5 |
| | eS | NE | 56 42 |
| | P: S,C | | |
| | 39.8 N., 144.2 E. | | |
| | East coast of Honshu, Japan. | | |
| | h: N. | | |
| | H= 13 54 09.9 | | USCGS |
| 4. | iP | Z | 14 15 15.8 |
| | P: C | | |
| | 40.1 N., 143.9 E. | | |
| | Off east coast of Honshu, Japan. | | |
| | h: N. | | |
| | H= 14 13 48.8 | | USCGS |
| 4. | eP | Z | 14 37 38 |
| | eX | Z | 45 |
| | eX | E | 44 24 |
| | eL | NE | 48 08 |
| 4. | eS | N | 16 42 00 |
| | eL | E | 50 14 |
| | 16.2 S., 173.0 W. | | |
| | Tonga Is. | | |
| | h: 42 km. | | |
| | H= 16 21 31.4 | | USCGS |
| 4. | P | NEZ | 16 49 15 |
| | 7.0 S., 129.9 E. | | |
| | Banda Sea. | | |
| | h: 93 km. | | |
| | H= 16 41 16.8 | | USCGS |
| 4. | P | NEZ | 19 40 13 |
| | S | N | 41 49 |
| | 29.0 N., 142.4 E. | | |
| | South of Honshu, Japan. | | |
| | h: N. | | |
| | H= 19 38 12.6 | | USCGS |
| 4. | P | Z | 20 22 53 |
| | eS | NE | 27 35 |
| | 15.2 N., 122.3 E. | | |
| | Philippine Is. region. | | |

(cont.)

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| Date | Phase | Comp. | Time(GMT) h m s |
|---|---|---|---|
| | h: 29 km. | | |
| | H= 20 17 25.6 | | USCGS |
| 4. | P | NEZ | 20 49 44 |
| 5. | iP | Z | 04 51 39.5 |
| | P: C | | |
| 5. | P | EZ | 09 40 43 |
| | 39.3 N., 142.2 E. | | |
| | Near Honshu, Japan. | | |
| | h: 50 km. | | |
| | H= 09 39 37.3 | | JMA |
| 5. | P | EZ | 10 32 29 |
| | S | E | 55 |
| 5. | eP | Z | 10 54 37 |
| | iX | Z | 42 |
| | eS | N | 11 01 40 |
| | eLq | N | 05 48 |
| | Lr | N | 07 25 |
| | 4.9 N., 96.3 E. | | |
| | Northern Sumatra. | | |
| | h: N. | | |
| | H= 10 45 43.5 | | USCGS |
| 5. | P | Z | 11 07 53 |
| | 7.1 S., 129.1 E. | | |
| | Banda Sea. | | |
| | h: 156 km. | | |
| | H= 10 59 59.1 | | USCGS |
| 5. | eP | Z | 11 17 38 |
| | 40.0 N., 142.1 E. | | |
| | Near Honshu, Japan. | | |
| | h: 50 km. | | |
| | H= 11 16 26.7 | | JMA |
| 5. | iP | NEZ | 12 50 50.8 |
| | S | NEZ | 51 00 |
| | P: N,E,C | | |
| 5. | iP | NEZ | 16 32 46.8 |
| | S | NEZ | 55 |
| | P: N,E,C | | |
| 5. | iP NZ, P E | | 17 27 08.4 |
| | eX | N | 31 43 |
| | L | EZ | 35 22 |
| | L | N | 28 |
| | P: S,D | | |
| | 1.9 N., 127.4 E. | | |
| | Halmahera. | | |
| | h: 97 km. | | |
| | H= 17 20 16.4 | | USCGS |
| 5. | iX | Z | 17 33 10 |
| | eL | E | 18 00.0 |
| 5. | iP | NEZ | 17 42 47.0 |
| | S | N | 43 06 |
| | P: S,W,C | | |
| 5. | iP Z, P E | | 22 19 22.7 |
| | iX | Z | 52 |
| | P: C | | |
| | 36.9 N., 141.7 E. | | |
| | Near Honshu, Japan. | | |
| | h: 40 km. | | |
| | H= 22 18 36.5 | | JMA |
| 5. | P | NEZ | 22 22 58 |
| | iX | Z | 23 24 |
| | X | NZ | 36 |
| 5. | eP | Z | 22 28 33 |
| | S | E | 29 10 |
| 6. | iP | NZ | 07 02 30.4 |
| | P: S,C | | |
| | 46.1 N., 143.1 E. | | |
| | Sakhalin I. | | |
| | h: 326 km. | | |
| | H= 07 00 08.6 | | USCGS |
| 6. | iP | EZ | 15 48 47.7 |
| | iX | N | 48.1 |
| | iX | Z | 49 11 |
| | iX | Z | 27 |
| | P: E,D | | |
| | 36.6 N., 141.3 E. | | |
| | Near Honshu, Japan. | | |
| | h: 50 km. | | |
| | H= 15 48 07.4 | | JMA |
| 6. | iP | NZ | 17 39 01.8 |
| | S | NEZ | 21 |
| | P: N,C | | |
| 6. | ePKP | Z | 22 45 20 |
| | iX | Z | 34 |
| | 22.6 S., 68.4 W. | | |
| | Northern Chile. | | |
| | h: 125 km. | | |
| | H= 22 25 37.3 | | USCGS |
| 7. | iP | Z | 02 40 19.9 |
| | iX | NE | 20.1 |
| | S | NEZ | 46 |
| | P: D | | |
| 7. | eP | Z | 07 57 53 |
| 7. | iP Z, P E | | 12 05 07.7 |
| | S | NE | 39 |
| | P: E,C | | |

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| Date | Phase | Comp. | Time(GMT) h m s |
|---|---|---|---|
| 7. | iP Z, P NE | | 13 29 13.0 |
| | iX | Z | 32 |
| | P: D | | |
| | 35.7 N., 139.9 E. | | |
| | Honshu, Japan. | | |
| | h: 70 km. | | |
| | H= 13 28 44.2 | | JMA |
| 7. | P | EZ | 15 17 33 |
| | S | NEZ | 48 |
| 7. | P | NEZ | 22 54 47 |
| | PcP | Z | 56 54 |
| | S | E | 23 00 54 |
| | eLq | E | 03 49 |
| | Lr | Z | 05 55 |
| | P: C | | |
| | 52.5 N., 169.1 W. | | |
| | Fox Is. | | |
| | h: 42 km. | | |
| | H= 22 47 15.4 | | USCGS |
| 8. | eP | Z | 01 51 12 |
| | eS | Z | 37 |
| 8. | P | Z | 04 23 47 |
| 8. | P | Z | 06 15 03 |
| | X | Z | 23 |
| | eX | N | 21 18 |
| | 52.3 N., 173.3 E. | | |
| | Near Is., Aleutian Is. | | |
| | h: 54 km. | | |
| | H= 06 09 01.6 | | USCGS |
| 8. | iP | Z | 08 04 42.0 |
| | iS | E | 59.1 |
| | iS | Z | 59.4 |
| | P: D | | |
| 8. | P | Z | 09 13 41 |
| 8. | P | NZ | 12 05 06 |
| | S | N | 31 |
| 8. | iP | EZ | 12 38 13.2 |
| | eS | N | 49 |
| | P: E,D | | |
| 8. | P | EZ | 14 54 27 |
| | iX | NEZ | 28.5 |
| | S | EZ | 58 31 |
| | Lq | E | 59 49 |
| | Lr | Z | 15 00 54 |
| | P: C | | |
| | 53.3 N., 159.7 E. | | |
| | Near east coast of Kamchatka. | | |
| | h: 135 km. | | |
| | H= 18 25 17.6 | | USCGS |

| Date | Phase | Comp. | Time(GMT) h m s |
|---|---|---|---|
| 8. | P | Z | 21 51 02 |
| | iX | NEZ | 03.0 |
| | 25.3 N., 179.6 W. | | |
| | South of Fiji Is. | | |
| | h: 412 km. | | |
| | H= 21 40 13.4 | | USCGS |
| 9. | eP | Z | 01 59 30 |
| | eX | EZ | 02 00 00 |
| | eL | N | 03 53 |
| | L | Z | 05 00 |
| | 23.7 N., 120.9 E. | | |
| | Taiwan. | | |
| | h: 46 km. | | |
| | H= 01 55 00.4 | | USCGS |
| 9. | P | NEZ | 02 16 29 |
| | S | Z | 18 08 |
| 9. | P | NZ | 02 23 16 |
| | iX | Z | 18.0 |
| | iX | E | 18.5 |
| | eS | E | 24 20 |
| | 31.6 N., 139.8 E. | | |
| | South of Honshu, Japan. | | |
| | h: 41 km. | | |
| | H= 02 21 57.7 | | USCGS |
| 9. | iP Z, P NE | | 06 05 40.6 |
| | S | NE | 06 06 |
| | P: E,D | | |
| 9. | eP | Z | 06 53 50 |
| | S | E | 07 04 50 |
| | L | E | 07 54 |
| | 3.2 S., 142.9 E. | | |
| | Near north coast of New Guinea. | | |
| | h: 17 km. | | |
| | H= 06 51 16.1 | | USCGS |
| 9. | iP | EZ | 07 00 30.0 |
| | S | NEZ | 43 |
| | P: W,C | | |
| 9. | iP | Z | 07 03 23.6 |
| | S | NEZ | 36 |
| | P: N,W,C | | |
| | 36.7 N., 139.5 E. | | |
| | Honshu, Japan. | | |
| | h: 30 km. | | |
| | H= 16 03 04.0 | | JMA |
| 9. | eP | Z | 08 40 38 |
| 9. | eP | Z | 12 07 17 |
| 9. | P | Z | 13 44 11 |
| | S | NE | 36 |

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| Date | Phase | Comp. | Time(GMT) h m s | |
|---|---|---|---|---|
| 9. | P | NZ | 14 22 59 | |
| | 52.3 N., 157.8 E. | | | |
| | Kamchatka. | | | |
| | h: 118 km. | | | |
| | H= 14 18 24.6 | | | USCGS |
| 9. | P | Z | 19 48 33 | |
| | 11.9 S., 165.7 E. | | | |
| | Santa Cruz Is. | | | |
| | h: 54 km. | | | |
| | H= 19 39 07.7 | | | USCGS |
| 9. | iP | Z | 22 04 37.9 | |
| | eX | N | 12 17 | |
| | ScS | N | 15 00 | |
| | eX | N | 18 32 | |
| | L | Z | 27 22 | |
| | P: C | | | |
| | 23.5 S., 175.0 W. | | | |
| | Tonga Is. | | | |
| | h: N. | | | |
| | H= 21 53 01.3 | | | USCGS |
| 9. | eP | Z | 23 02 59 | |
| | iX | Z | 03 10 | |
| | eS | N | 52 | |
| 9. | iP Z, P NE | | 23 12 21.4 | |
| | eS | N | 14 24 | |
| | P: C | | | |
| | 43.5 N., 148.7 E. | | | |
| | Off east coast of Hokkaido, Japan. | | | |
| | h: 50 km. | | | |
| | H= 23 09 47.8 | | | JMA |
| 9. | iP | Z | 23 39 11.0 | |
| | eS | NE | 37 | |
| | P: D | | | |
| 10. | iP Z, P NE | | 03 36 25.3 | |
| | iS | NE | 32.8 | |
| | P: C | | | |
| 10. | iP | EZ | 06 19 07.4 | |
| | iS | NZ | 12.0 | |
| | P: E,D | | | |
| 10. | eP | EZ | 08 38 21 | |
| | eS | NE | 42 | |
| 10. | P | EZ | 15 33 20 | |
| | 51.8 N., 176.1 W. | | | |
| | Andreanof Is. | | | |
| | h: 65 km. | | | |
| | H= 15 26 27.6 | | | USCGS |
| 10. | iP | NEZ | 16 42 23.0 | |
| | | | (cont.) | |



| Date | Phase | Comp. | Time(GMT) h m s | |
|---|---|---|---|---|
| | S | E | 16 43 24 | |
| | P: N,E,D | | | |
| | 38.3 N., 141.6 E. | | | |
| | Near east coast of Honshu , Japan. | | | |
| | h: 115 km. | | | |
| | H= 16 41 43.5 | | | USCGS |
| 10. | eP | Z | 17 21 14 | |
| | X | Z | 36 | |
| | S | N | 26 10 | |
| | X | E | 17 | |
| | Lq | E | 27 00 | |
| | Lr | Z | 28 13 | |
| | 13.2 N., 121.4 E. | | | |
| | Mindoro , P.I. | | | |
| | h: 37 km. | | | |
| | H= 17 15 29.4 | | | USCGS |
| 10. | iP | NEZ | 22 53 19.3 | |
| | S | N | 54 25 | |
| | L | N | 55 | |
| | L | Z | 56 06 | |
| | P: S,W,C | | | |
| | 40.3 N., 143.9 E. | | | |
| | Off east coast of Honshu, Japan. | | | |
| | h: 30 km. | | | |
| | H= 22 51 50.7 | | | USCGS |
| 10. | P | NEZ | 23 01 11 | |
| | X | Z | 24 | |
| | eX | Z | 50 | |
| | L | N | 03 22 | |
| | L | Z | 54 | |
| 10. | P | EZ | 23 39 53 | |
| | S | E | 40 40 | |
| 11. | P | NEZ | 01 07 29 | |
| | S | N | 15 02 | |
| | S | E | 04 | |
| | eL | N | 28.3 | |
| | eL | Z | 29.6 | |
| 11. | P | Z | 01 14 19 | |
| | 59.6 N., 144.8 W. | | | |
| | Gulf of Alaska. | | | |
| | h: 12 km. | | | |
| | H= 01 05 01.3 | | | USCGS |
| 11. | P | NZ | 04 57 15 | |
| | P | E | 16 | |
| | eL | N | 05 09.5 | |
| | 1.1 N., 98.8 E. | | | |
| | Northern Sumatra. | | | |
| | h: 53 km. | | | |
| | H= 04 48 20.3 | | | USCGS |

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| Date | Phase | Comp. | Time(GMT) h m s | |
|---|---|---|---|---|
| 11. | eP | Z | 05 51 38 | |
| | X | Z | 49 | |
| | eL | Z | 06 05.0 | |
| | 2.9 S., 129.2 E. | | | |
| | Ceram. | | | |
| | h: 53 km. | | | |
| | H= 05 44 06.3 | | | USCGS |
| 11. | eP | EZ | 06 15 39 | |
| | S | NE | 16 03 | |
| 11. | P | NEZ | 06 24 19 | |
| | iX | Z | 19.8 | |
| 11. | P | Z | 08 09 53 | |
| | S | NE | 10 15 | |
| 11. | iP | EZ | 09 31 27.5 | |
| | X | N | 28.0 | |
| | P: W,D | | | |
| 11. | iP | Z | 09 44 08.3 | |
| | S | NE | 34 | |
| | P: D | | | |
| 11. | eP | Z | 12 23 46 | |
| | eX | N | 28.5 | |
| | eX | E | 28.7 | |
| | X | E | 29 55 | |
| | X | N | 30 50 | |
| | X | Z | 56 | |
| | eX | E | 33.0 | |
| 11. | iP | NZ | 15 13 27.3 | |
| | S | NE | 15 15 | |
| | P: N,C | | | |
| | 27.4 N., 139.9 E. | | | |
| | Bonin Is. region. | | | |
| | h: 500 km. | | | |
| | H= 15 11 17.4 | | | USCGS |
| 11. | X | Z | 15 14 48 | |
| | X | N | 56 | |
| | X | E | 15 10 | |
| | X | Z | 17 12 | |
| | X | E | 18 | |
| | X | N | 24 | |
| | X | Z | 21 32 | |
| 11. | iP | Z | 15 44 02.3 | |
| | X | E | 04 | |
| | S | NE | 45 53 | |
| 11. | P | Z | 21 11 46 | |
| | iX | NEZ | 48.0 | |
| | S | N | 12 08 | |
| 11. | P | Z | 21 34 46 | |

| Date | Phase | Comp. | Time(GMT) h m s | |
|---|---|---|---|---|
| 11. | iP | Z | 23 23 12.0 | |
| | P: D | | | |
| | 17.8 S., 179.9 W. | | | |
| | Fiji Is. region. | | | |
| | h: 609 km. | | | |
| | H= 23 13 17.7 | | | USCGS |
| 11. | P | NEZ | 23 56 22 | |
| 12. | P | NEZ | 00 26 41 | |
| | S | NE | 27 07 | |
| 12. | P | Z | 04 17 16 | |
| | iX | N | 17.0 | |
| | iX | E | 17.8 | |
| | S | N | 18 30 | |
| | S | E | 32 | |
| | P: D | | | |
| | 32.2 N., 138.8 E. | | | |
| | South of Honshu, Japan. | | | |
| | h: 374 km. | | | |
| | H= 04 16 09.8 | | | USCGS |
| 12. | P | NEZ | 05 23 41 | |
| | S | E | 24 14 | |
| | S | N | 15 | |
| | 36.8 N., 141.6 E. | | | |
| | Near east coast of Honshu, Japan. | | | |
| | h: 50 km. | | | |
| | H= 05 22 56.4 | | | JMA |
| 12. | iP | NEZ | 06 35 07.0 | |
| | S | NE | 33 | |
| | P: N,E,D | | | |
| 12. | iP | NEZ | 07 42 50.7 | |
| | S | N | 43 53 | |
| | P: S,W,C | | | |
| | 40.3 N., 143.7 E. | | | |
| | Off east coast of Honshu, Japan. | | | |
| | h: N. | | | |
| | H= 07 41 25.1 | | | USCGS |
| 12. | P | NEZ | 07 49 48 | |
| 12. | iP | Z | 08 04 56.0 | |
| | eX | N | 06 44 | |
| | P: C | | | |
| | 41.6 N., 142.6 E. | | | |
| | Near coast of Hokkaido, Japan. | | | |
| | h: 30 km. | | | |
| | H= 17 03 23.5 | | | JMA |
| 12. | iP | NEZ | 09 05 22.9 | |
| | iS | NEZ | 31.3 | |
| | P: N,E,C | | | |

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| Date | Phase | Comp. | Time(GMT) h m s |
|---|---|---|---|
| 12. | eP | EZ | 09 12 13 |
| 12. | iP Z, P NE | | 10 27 12.5 |
| | S | NE | 28 17 |
| | X | NE | 55 |
| | X | N | 32 40 |
| | P: S,W,C | | |
| | 40.1 N., 144.2 E. | | |
| | Near east coast of Honshu, Japan. | | |
| | h: 50 km. | | |
| | H= 10 25 42.0 | | USCGS |
| 12. | P | NEZ | 10 34 00 |
| 12. | P | NZ | 12 28 46 |
| | 19.3 N., 120.9 E. | | |
| | Philippine Is. region. | | |
| | h: 49 km. | | |
| | H= 12 33 44.6 | | USCGS |
| 12. | P | Z | 12 57 53 |
| | eL | N | 13 02.5 |
| | eL | NZ | 05.5 |
| | 9.4 N., 126.2 E. | | |
| | Mindanao , P.I. | | |
| | h: 69 km. | | |
| | H= 12 51 57.7 | | USCGS |
| 12. | eP | Z | 14 15 10 |
| 12. | P | NE | 14 54 25 |
| 12. | P | EZ | 15 26 10 |
| | PP | Z | 29 26 |
| | PP | NE | 30 |
| | X | Z | 32 57 |
| | X | N | 33 15 |
| | S | N | 36 33 |
| | S | E | 42 |
| | S | Z | 44 |
| | SS | Z | 43 00 |
| | eLq | E | 49.1 |
| | eLr | Z | 54.5 |
| | eLr | N | 55.3 |
| | eL | Z | 16 01.1 |
| | Mag. $6\frac{1}{2}$ - $6\frac{3}{4}$ (Mat.) | | |
| | 34.4 N., 25.1 E. | | |
| | Crete. | | |
| | h: 25 km. | | |
| | H= 15 13 31.1 | | USCGS |
| 12. | P | EZ | 16 18 01 |
| | eS | E | 43 |
| 12. | P | EZ | 18 59 40 |
| | X | N | 19 00 45 |
| | X | E | 48 |

(cont.)

| Date | Phase | Comp. | Time(GMT) h m s |
|---|---|---|---|
| | X | Z | 19 01 00 |
| | X | N | 23 |
| | PP | Z | 55 |
| | PPP | Z | 03 30 |
| | S | N | 06 50 |
| | S | Z | 53 |
| | S | E | 56 |
| | eL | NEZ | 08.1 |
| 12. | iP | EZ | 20 20 31.0 |
| | X | EZ | 43 |
| | S | E | 53 |
| | P: W,C | | |
| 12. | PKP 1 | Z | 20 48 29 |
| | X | Z | 49 00 |
| | X | Z | 20 |
| | PP | Z | 52 32 |
| | SS | E | 21 12 30 |
| | eSSS | E | 18.5 |
| | eLq | E | 34.0 |
| | eLr | Z | 46.7 |
| | 56.5 S., 25.3 W. | | |
| | South Sandwich Is. region. | | |
| | h: 9 km. | | |
| | H= 20 28 31.9 | | USCGS |
| 12. | P | Z | 21 56 56 |
| | 52.5 N., 173.9 W. | | |
| | Andreanof Is. | | |
| | h: 52 km. | | |
| | H= 21 49 50.5 | | USCGS |
| 12. | eP | Z | 22 04 53 |
| 13. | eP | Z | 01 35 52 |
| | 34.3 N., 25.1 E. | | |
| | Crete. | | |
| | h: 38 km. | | |
| | H= 01 23 13.8 | | USCGS |
| 13. | eP | Z | 02 38 03 |
| | eP | NE | 04 |
| | eX | E | 50 |
| 13. | P | NEZ | 08 52 34 |
| | iX | NEZ | 36.3 |
| | X | E | 53 06 |
| | X | E | 41 |
| | S | N | 55 56 |
| | S | E | 58 |
| | S | Z | 56 02 |
| | eL | Z | 57 40 |
| | eL | E | 58 10 |
| | eL | N | 15 |
| | Mag. $6\frac{1}{4}$ (Mat.) | | |
| | 49.4 N., 155.5 E. | | |
| | Kurile Is. | | |
| | h: 64 km. | | |
| | H= 08 48 29.5 | | USCGS |

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| Date | Phase | Comp. | Time(GMT) h m s |
|---|---|---|---|
| 13. | P | NZ | 15 25 03 |
| | X | E | 04 |
| | 44.4 N., 140.4 E. | | |
| | Eastern Sea of Japan. | | |
| | h: 259 km. | | |
| | H= 15 23 08.3 | | USCGS |
| 13. | eP | Z | 16 21 53 |
| | X | N | 26 45 |
| | eL | E | 27.5 |
| | eL | N | 28.0 |
| | eL | Z | 28.5 |
| | eL | Z | 29.8 |
| 14. | eP | Z | 00 29 47 |
| | 51.3 N., 179.1 W, | | |
| | Andreanof Is. | | |
| | h: 38 km. | | |
| | H= 00 23 11.4 | | USCGS |
| 14. | P | NEZ | 03 31 33 |
| | X | N | 34 00 |
| | S | NEZ | 38 30 |
| | eL | E | 41.7 |
| | eL | N | 42.0 |
| | eL | Z | 42.5 |
| | eL | Z | 44.0 |
| | Mag. 6 - 6¼ (Mat.) | | |
| | 7.9 S., 159.0 E. | | |
| | Solomon Is. | | |
| | h: 62 km. | | |
| | H= 03 22 56.8 | | USCGS |
| 14 | eP | Z | 03 46 10 |
| | 7.1 N., 124.0 E. | | |
| | Mindanao , P.I. | | |
| | h: N. | | |
| | H= 03 39 45.4 | | USCGS |
| 14. | eP | Z | 05 17 04 |
| | 60.0 N., 147.2 W. | | |
| | Southern Alaska. | | |
| | h: 25 km. | | |
| | H= 05 09 38.6 | | USCGS |
| 14. | iP | NEZ | 08 12 58.0 |
| | S | NEZ | 13 41 |
| | P: N,W,C | | |
| | 35.9 N., 140.2 E. | | |
| | Near east coast of Honshu, Japan. | | |
| | h: 57 km. | | |
| | H= 08 12 29.7 | | USCGS |
| 14. | eP | Z | 08 17 26 |
| 14. | iP | NEZ | 08 38 45.0 |
| | S | NE | 39 11 |
| | P: S,E,D | | |

| Date | Phase | Comp. | Time(GMT) h m s |
|---|---|---|---|
| 14. | P | NEZ | 09 33 55 |
| | X | Z | 40 00 |
| | X | NE | 06 |
| | eL | Z | 43.0 |
| | eL | N | 43.2 |
| 14. | P | NZ | 14 00 07 |
| | eX | NEZ | 10.5 |
| 14. | eL | NE | 18 18 |
| | eL | Z | 27 |
| | 34.3 N., 25.1 E. | | |
| | Crete. | | |
| | h: 9 km. | | |
| | H= 13 47 24.2 | | USCGS |
| 14. | P | NZ | 21 54 16 |
| | X | N | 55 36 |
| | X | E | 50 |
| | X | N | 52 |
| | X | Z | 53 |
| 14. | P | Z | 22 41 36 |
| | eS | N | 42 00 |
| 15. | iP | NZ | 04 33 30.2 |
| | P: N,C | | |
| | 8.6 S., 124.0 E. | | |
| | Timor. | | |
| | h: 36 km. | | |
| | H= 04 25 01.6 | | USCGS |
| 15. | iP | EZ | 17 05 46.8 |
| | eX | N | 13 30 |
| | eX | E | 40 |
| | eL | NEZ | 17.4 |
| | P: E,C | | |
| | 4.7 S., 102.2 E | | |
| | Southern Sumatra. | | |
| | h: 38 km. | | |
| | H= 16 56 32.0 | | USCGS |
| 15. | iP | EZ | 19 04 11.2 |
| | S | EZ | 25 |
| | P: E,D | | |
| 15. | iP Z, P NE | | 08 08 08.3 |
| | iX | NEZ | 08.8 |
| | S | E | 09 34 |
| | S | N | 35 |
| | P: C | | |
| 16. | iP | EZ | 08 46 06.5 |
| | S | N | 20 |
| | P: E,D | | |
| | 36.3 N., 139.9 E. | | |
| | Honshu, Japan. | | |
| | h: 50 km. | | |
| | H= 17 45 41.9 | | JMA |

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| Date | Phase | Comp. | Time(GMT) h m s |
|---|---|---|---|
| 16. | iP | Z | 13 23 47.2 |
| | iS | NE | 24 13.0 |
| | P: D | | |
| 16. | P | NZ | 15 53 49 |
| | X | E | 50 |
| | X | NZ | 56 |
| | X | E | 57 |
| | eX | Z | 54 45 |
| | PP | NZ | 56 00 |
| | PP | E | 10 |
| | S | E | 16 00 12 |
| | S | N | 13 |
| | S | Z | 16 |
| | SS | E | 03 28 |
| | SS | N | 40 |
| | SS | Z | 50 |
| | L | NEZ | 06.5 |
| | 4.9 S., 125.7 E. | | |
| | Banda Sea. | | |
| | h: 38 km. | | |
| | H= 15 45 53.3 | | USCGS |
| 16. | eP | Z | 16 46 18 |
| | S | NEZ | 47 17 |
| | 35.4 N., 134.0 E. | | |
| | Honshu, Japan. | | |
| | h: 10 km. | | |
| | H= 16 45 19.9 | | JMA |
| 16. | iP | NEZ | 17 22 28.1 |
| | P: S,W,D | | |
| 16. | P | Z | 20 12 53 |
| 16. | P | NEZ | 21 31 15 |
| 17. | P | NZ | 01 06 27 |
| 17. | P | NEZ | 02 45 40 |
| | iX | N | 40.8 |
| | eX | NE | 58 |
| 17. | eX | E | 06 05 40 |
| | eX | NEZ | 06 20 |
| 17. | P NZ, eP E | | 07 56 45 |
| | eS | E | 57 25 |
| 17. | P | Z | 15 38 19 |
| | iX | NEZ | 19.7 |
| | X | NE | 33 |
| | eS | NE | 45 |
| 17. | iP | NEZ | 19 30 32.7 |
| | pP | N | 31 32 |
| | pP | Z | 34 |
| | S | N | 33 48 |

(cont.)

| Date | Phase | Comp. | Time(GMT) h m s |
|---|---|---|---|
| | S | E | 19 33 50 |
| | ScP | Z | 38 03.2 |
| | ScS | NE | 41 43 |
| | P: S,E,D | | |
| | Mag. 6¼ - 7 (Mat.) | | |
| | 19.0 N., 145.5 E. | | |
| | Mariana Is. | | |
| | h: 206 km. | | |
| | H= 19 26 28.9 | | USCGS |
| 17. | P | Z | 20 05 04 |
| 17. | eP | Z | 20 13 57 |
| 17. | P | Z | 23 35 43 |
| | 43.2 N., 45.3 E. | | |
| | Eastern Caucasus. | | |
| | h: 6 km. | | |
| | H= 23 24 41.7 | | USCGS |
| 18. | P | Z | 00 11 09 |
| | X | N | 11 |
| | X | E | 12 |
| | X | NZ | 15 |
| | X | Z | 12 55 |
| | PP | Z | 14 50 |
| | X | Z | 15 00 |
| | S | NEZ | 21 48 |
| | eLq | E | 35.0 |
| | eLr | E | 38.5 |
| | Mag. 7 - 7¼ (Mat.) | | |
| | 52.6 S., 159.7 E. | | |
| | Macquarie Is. region. | | |
| | h: N. | | |
| | H= 23 58 10.1 | | USCGS |
| 18. | iP | Z | 00 31 48.5 |
| | eS | Z | 32 48 |
| | S | E | 50 |
| | P: C | | |
| | 40.8 N., 139.4 E. | | |
| | Near west coast of Honshu, Japan. | | |
| | h: 10 km. | | |
| | H= 00 30 38.8 | | JMA |
| 18. | P | NZ | 01 48 01 |
| | 59.5 N., 145.0 W. | | |
| | Gulf of Alaska. | | |
| | h: N. | | |
| | H= 01 38 46.4 | | USCGS |
| 18. | eP | Z | 02 25 10 |
| 18. | P | Z | 05 22 19 |
| | eS | E | 45 |

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| Date | Phase | Comp. | Time(GMT) h m s |
|---|---|---|---|
| 18. | P | Z | 07 29 38 |
| | S | E | 34 15 |
| | eL | NZ | 36.5 |
| | 13.3 N., 145.2 E. | | |
| | Mariana Is. | | |
| | h: 52 km. | | |
| | H= 07 24 26.1 | | USCGS |
| 18. | iP | NEZ | 08 22 57.8 |
| | iS | NEZ | 23 34 |
| | P: N,E,C | | |
| | 34.6 N., 138.0 E. | | |
| | Near Honshu, Japan. | | |
| | h: 280 km. | | |
| | H= 08 22 11.0 | | JMA |
| 18. | P | NEZ | 12 33 19 |
| | eS | N | 34 37 |
| | 40.2 N., 142.6 E. | | |
| | Near east coast of Honshu, Japan. | | |
| | h: 50 km. | | |
| | H= 12 32 05.0 | | JMA |
| 18. | P | NEZ | 12 50 42 |
| | S | NEZ | 51 02 |
| 18. | P | EZ | 20 17 27 |
| | X | Z | 18 45 |
| | 5.9 N., 94.7 E. | | |
| | Northern Sumatra. | | |
| | h: 69 km. | | |
| | H= 20 08 36.4 | | USCGS |
| 18. | P | NZ | 20 50 35 |
| | iX | NZ | 35.9 |
| | PP | Z | 52 24 |
| | S | NE | 56 13 |
| | Lq | N | 59 05 |
| | Lq | EZ | 10 |
| | Lr | N | 21 01 23 |
| | Lr | Z | 25 |
| | 0.5 N., 126.1 E. | | |
| | Molucca Passage. | | |
| | h: 5 km. | | |
| | H= 20 43 19.2 | | USCGS |
| 18. | P | EZ | 22 16 11 |
| | S | N | 32 |
| 18. | P | EZ | 22 19 03 |
| 18. | P | Z | 22 33 30 |
| | X | N | 32 |
| | S | N | 57 |
| | S | E | 58 |
| 18. | eP | Z | 23 41 15 |

| Date | Phase | Comp. | Time(GMT) h m s |
|---|---|---|---|
| 18. | iP | NEZ | 23 51 51.2 |
| | X | Z | 52 04 |
| | X | E | 05 |
| | PP | Z | 53 28 |
| | S | NE | 57 45 |
| | S | Z | 55 |
| | Lq | Z | 00 00 40 |
| | Lr | Z | 02 55 |
| | L | E | 05 35 |
| | P: S,W,C | | |
| | Mag. 5¾ - 6 (Mat.) | | |
| | 52.6 N., 167.9 W. | | |
| | Fox Is. | | |
| | h: 18 km. | | |
| | H= 23 44 11.2 | | USCGS |
| 19. | P | NEZ | 04 54 09 |
| 19. | iP | NEZ | 05 15 30.1 |
| | S | N | 16 05 |
| | P: S,E,D | | |
| | 34.1 N., 140.2 E. | | |
| | Near east coast of Honshu, Japan. | | |
| | h: 46 km. | | |
| | H= 05 14 44.0 | | USCGS |
| 19. | eP | Z | 05 38 41 |
| | S | N | 43 30 |
| | L | N | 44 08 |
| | L | E | 13 |
| | L | Z | 45 08 |
| 19. | iP | Z | 06 01 51.9 |
| | S | NEZ | 02 16 |
| | P: C | | |
| 19. | iP | EZ | 07 05 39.6 |
| | X | Z | 50 |
| | S | N | 07 40 |
| | X | Z | 53 |
| | X | E | 55 |
| | Lr | Z | 08 38 |
| | P: E,C | | |
| | 28.1 N., 130.0 E. | | |
| | Ryukyu Is. | | |
| | h: 45 km. | | |
| | H= 07 03 04.9 | | USCGS |
| 19. | P | Z | 09 56 58 |
| 19. | iP | EZ | 13 33 47.8 |
| | X | N | 48.3 |
| | X | NE | 34 16 |
| | P: W,C | | |
| 19. | iP | NEZ | 13 46 52.4 |
| | P: S,E,D | | |



(cont.)

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| Date | Phase | Comp. | Time(GMT) h m s |
|---|---|---|---|
| | 18.0 S., 178.3 W. | | |
| | Fiji Is. region. | | |
| | h: 545 km. | | |
| | H= 13 36 45.9 | | USCGS |
| 19. | iP Z, P E | | 15 06 27.1 |
| | iX | E | 27.4 |
| | iX | N | 27.6 |
| | S | NE | 07 01 |
| | P: C | | |
| 19. | iP | NEZ | 15 38 20.6 |
| | eS | E | 47 |
| | P: N,W,C | | |
| 19. | iP | Z | 18 52 45.3 |
| | iX | NE | 45.7 |
| | P: C | | |
| 19. | P | NEZ | 19 01 45 |
| | iX | NEZ | 46.2 |
| | S | EZ | 05 48 |
| | S | N | 50 |
| | eL | E | 06 51 |
| | eL | Z | 08 20 |
| | 53.3 N., 159.9 E. | | |
| | Near east coast of Kamchatka. | | |
| | h: 41 km. | | |
| | H= 18 56 46.9 | | USCGS |
| 19. | P | NZ | 20 32 57 |
| | L | EZ | 45.0 |
| | 54.2 N., 164.0 W. | | |
| | Unimak I. region. | | |
| | h: 25 km. | | |
| | H= 20 24 59.6 | | USCGS |
| 19. | iP | Z | 21 40 56.8 |
| | iX | N | 58.0 |
| | iX | Z | 41 10.3 |
| | X | N | 11 |
| | X | N | 51 40 |
| | eL | Z | 53.5 |
| | P: D | | |
| | 52.7 N., 167.8 W. | | |
| | Fox Is. | | |
| | h: 14 km. | | |
| | H= 21 33 16.6 | | USCGS |
| 20. | iP Z, P E | | 02 45 55.2 |
| | iX | N | 56.0 |
| | X | NEZ | 46 07 |
| | X | E | 18 |
| | X | NE | 20 |
| | X | N | 48 30 |
| | PcS | Z | 51 31 |
| | S | N | 52 27 |
| | S | Z | 30 |
| | | | (cont.) |

| Date | Phase | Comp. | Time(GMT) h m s |
|---|---|---|---|
| | S | E | 02 52 40 |
| | L | NE | 55 45 |
| | Lr | N | 57 26 |
| | P: D | | |
| | Mag. 5¼ - 5½ (Mat.) | | |
| | 53.2 N., 162.4 W. | | |
| | South of Alaska. | | |
| | h: 44 km. | | |
| | H= 02 37 51.5 | | USCGS |
| 20. | iP | Z | 03 11 15.0 |
| | P: C | | |
| | 32.1 N., 131.9 E. | | |
| | Near east coast of Kyushu , Japan. | | |
| | h: 0 km. | | |
| | H= 03 09 32.2 | | JMA |
| 20. | P | NEZ | 06 34 35 |
| | S | NZ | 35 13 |
| | 34.9 N., 135.0 E. | | |
| | Honshu, Japan. | | |
| | h: 0 km. | | |
| | H= 06 33 36.3 | | JMA |
| 20. | iP | NEZ | 06 42 01.1 |
| | S | N | 44 |
| | P: S,W,C | | |
| | 38.6 N., 141.8 E. | | |
| | Near east coast of Honshu, Japan. | | |
| | h: 86 km. | | |
| | H= 06 41 06.2 | | USCGS |
| 20. | iP | Z | 06 50 45.7 |
| | P: C | | |
| | 2.6 N., 128.5 E. | | |
| | Halmahera. | | |
| | h: 77 km. | | |
| | H= 06 44 00.7 | | USCGS |
| 20. | P | NEZ | 07 08 45 |
| | iX | NEZ | 45.6 |
| | S | NE | 09 24 |
| | 34.9 N., 135.1 E. | | |
| | Honshu, Japan. | | |
| | h: 10 km. | | |
| | H= 07 07 47.8 | | JMA |
| 20. | iP | NEZ | 08 54 15.5 |
| | eS | N | 21 |
| | P: N,E,C | | |
| 20. | iP | NEZ | 08 57 18.6 |
| | S | NEZ | 24 |
| | P: N,E,C | | |
| 20. | iP | NEZ | 15 39 08.4 |
| | S | E | 40 13 |
| | | | (cont.) |

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| Date | Phase | Comp. | Time(GMT) h m s |
|---|---|---|---|
| | X | NEZ | 15 40 33 |
| | P: S,W,C | | |
| | 40.8 N., 142.1 E. | | |
| | Near east coast of Honshu, Japan. | | |
| | h: 67 km. | | |
| | H= 15 37 50.2 | | USCGS |
| 20. | iP | EZ | 21 20 07.5 |
| | S | EZ | 45 |
| | P: E,D | | |
| | 37.0 N., 141.2 E. | | |
| | Near east coast of Honshu, Japan. | | |
| | h: 73 km. | | |
| | H= 21 19 27.2 | | USCGS |
| 20. | P | NZ | 23 04 15 |
| | X | NEZ | 17 |
| 21. | P | NZ | 01 30 14 |
| | S | N | 22 |
| | S | E | 23 |
| 21. | P | Z | 04 28 48 |
| | L | E | 36 10 |
| | X | EZ | 38 00 |
| | 5.0 N., 127.8 E. | | |
| | Philippine Is. region. | | |
| | h: 77 km. | | |
| | H= 04 22 20.8 | | USCGS |
| 21. | P | NZ | 06 42 24 |
| | X | N | 45 12 |
| | S | N | 47 12 |
| | L | E | 40 |
| | P: N,C | | |
| | 11.3 N., 125.3 E. | | |
| | Samar , P.I. | | |
| | h: 73 km. | | |
| | H= 06 36 43.1 | | USCGS |
| 21. | eP | Z | 07 53 03 |
| | iX | Z | 24.3 |
| | iPcP | Z | 56 30.1 |
| | S | NE | 57 57 |
| | Lq | E | 58 22 |
| | Lr | Z | 59 32 |
| | Mag. 6 - 6½ (Mat.) | | |
| | 13.3 N., 122.8 E. | | |
| | Luzon, P.I. | | |
| | h: 23 km. | | |
| | H= 07 47 24.4 | | USCGS |
| 21. | iP | NEZ | 08 31 16.5 |
| | S | NE | 32 04 |
| | P: S,W,C | | |

| Date | Phase | Comp. | Time(GMT) h m s |
|---|---|---|---|
| 21. | iP Z, P NE | | 15 20 09.5 |
| | iPcP | Z | 21 24.0 |
| | pP | Z | 59 |
| | ScP | Z | 24 25.6 |
| | ScP | E | 29.1 |
| | S | NEZ | 26 32 |
| | ScS | N | 28 56 |
| | G | NEZ | 32 57 |
| | P: N,E,C | | |
| | 5.5 S., 109.6 E. | | |
| | Java Sea. | | |
| | h: 561 km. | | |
| | H= 15 12 10.0 | | USCGS |
| 21. | P | Z | 16 04 09 |
| | S | NEZ | 19.0 |
| 21. | iP | EZ | 16 45 56.9 |
| | S? | N | 55 36 |
| | X | N | 17 08 10 |
| | P: E,C | | |
| | 27.4 N., 57.5 E. | | |
| | Southern Iran. | | |
| | h: 65 km. | | |
| | H= 16 35 08.3 | | USCGS |
| 21. | P | Z | 23 29 50 |
| | X | N | 40 40 |
| | X | N | 00 00 24 |
| 22. | P | Z | 01 42 08 |
| | S | NE | 49 04 |
| | X | N | 57 52 |
| | 30.6 N., 79.4 E. | | |
| | Tibet - India border region. | | |
| | h: 19 km. | | |
| | H= 01 33 24.1 | | USCGS |
| 22. | P | NZ | 02 38 17 |
| | iX | NEZ | 19.2 |
| | S | E | 41 58 |
| | L | NE | 43 00 |
| | L | Z | 32 |
| | 49.2 N., 158.5 E. | | |
| | Kurile Is. region. | | |
| | h: N. | | |
| | H= 02 33 52.8 | | USCGS |
| 22. | P | Z | 02 42 39 |
| 22. | P | Z | 06 24 28 |
| | 32.0 S., 177.9 W. | | |
| | South of Kermadec Is. | | |
| | h: N. | | |
| | H= 06 12 24.0 | | USCGS |
| 22. | L | N | 06 53 10 |

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| Date | Phase | Comp. | Time(GMT) h m s |
|---|---|---|---|
| 22. | iP | Z | 08 12 04.6 |
| 22. | iP | NZ | 10 06 26.0 |
| | P: S,C | | |
| 22. | iP | Z | 10 51 56.5 |
| | iX | NE | 57.2 |
| | iPcP | Z | 54 39.0 |
| | S | E | 57 17 |
| | iX | EZ | 58 20 |
| | Lq | NE | 59 06 |
| | Lq | Z | 30 |
| | P: C | | |
| | Mag. $5\frac{3}{4}$ - 6 (Mat.) | | |
| | 51.5 N., 179.9 W. | | |
| | Andreanof Is. | | |
| | h: 56 km. | | |
| | H= 10 45 24.5 | | USCGS |
| 22. | iP | Z | 13 37 48.0 |
| | S | N | 38 14.7 |
| 22. | P | Z | 16 04 50 |
| 22. | P | Z | 18 44 19 |
| | S | E | 47 40 |
| | 19.0 N., 145.5 E. | | |
| | Mariana Is. | | |
| | h: 134 km. | | |
| | H= 18 40 09.5 | | USCGS |
| 23. | P | Z | 00 30 49 |
| | S | E | 41 32 |
| 23. | iP | Z | 03 15 11.1 |
| | iX | NE | 11.5 |
| | S | NE | 16 27 |
| | P: C | | |
| | 30.5 N., 142.1 E. | | |
| | South of Honshu, Japan. | | |
| | h: 19 km. | | |
| | H= 03 13 29.3 | | USCGS |
| 23. | iP | NEZ | 05 57 53.0 |
| | S | NZ | 58 24 |
| | P: N,E,D | | |
| | Mag. 5.5 (Mat.) | | |
| | 37.4 N., 141.5 E. | | |
| | Near coast of Honshu, Japan. | | |
| | h: N. | | |
| | H= 05 57 06.9 | | USCGS |
| 23. | SKS | E | 07 32 48 |
| | PS | E | 35 04 |
| | SS | N | 40 30 |
| | Lq | N | 49 36 |
| | Lr | Z | 53 44 |
| | 18.4 N., 104.5 W. | | (cont.) |

| Date | Phase | Comp. | Time(GMT) h m s |
|---|---|---|---|
| | Near coast of Jalisco , Mexico. | | |
| | h: 36 km. | | |
| | H= 07 08 27.7 | | USCGS |
| 23. | iP | EZ | 17 57 09.9 |
| | X | Z | 29 |
| | S | Z | 54 |
| | P: E,D | | |
| 23. | P | Z | 18 35 29 |
| | S | N | 36 07 |
| 24. | P | Z | 01 21 18 |
| | iX | NZ | 18.7 |
| | S | E | 22 23 |
| | 39.2 N., 143.0 E. | | |
| | Off east coast of Honshu , Japan. | | |
| | h: 21 km. | | |
| | H= 01 20 06.5 | | USCGS |
| 24. | X | Z | 01 23 47 |
| | 31.3 N., 138.3 E. | | |
| | South of Honshu, Japan. | | |
| | h: 387 km. | | |
| | H= 01 21 12.1 | | USCGS |
| 24. | iP | NZ | 03 37 06.0 |
| | X | Z | 42 35 |
| | S | NEZ | 43 22 |
| | X | N | 45 00 |
| | Lq | NZ | 46 30 |
| | L | N | 48 00 |
| | P: N,C | | |
| | 5.8 S., 146.8 E. | | |
| | East New Guinea region. | | |
| | h: 113 km. | | |
| | H= 03 29 17.3 | | USCGS |
| 24. | P | Z | 11 03 43 |
| | X | Z | 04 28 |
| | PcP | Z | 07 14 |
| | S | N | 08 28 |
| | Lq | N | 09 18 |
| | Lr | Z | 10 16 |
| | Mag. $6\frac{1}{4}$ (Mat.) | | |
| | 13.3 N., 123.0 E. | | |
| | Luzon, P.I. | | |
| | h: 42 km. | | |
| | H= 10 58 07.3 | | USCGS |
| 24. | iP | NEZ | 11 25 52.0 |
| | S | NE | 26 08 |
| | P: E,D | | |
| 24. | iP | Z | 13 33 17.0 |
| | S | E | 37 |

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| Date | Phase | Comp. | Time(GMT) h m s |
|---|---|---|---|
| 24. | iP | Z | 15 09 15.2 |
| | S | NE | 10 00 |
| | P: D | | |
| 24. | iP | NZ | 22 53 24.4 |
| | S | NE | 46 |
| | P: C | | |
| 25. | P | Z | 00 14 44 |
| | S | NE | 19 40 |
| | Lr | NE | 21 28 |
| | Mag. 5½ - 5¾ (Mat.) | | |
| | 13.5 N., 120.3 E. | | |
| | Mindoro, P.I. | | |
| | h: 53 km. | | |
| | H= 00 08 55.3 | | USCGS |
| 25. | P | Z | 07 33 43 |
| | S | N | 40 52 |
| | L | NE | 44 40 |
| | L | N | 46 30 |
| | L | Z | 48 16 |
| | Mag. 6¼ (Mat.) | | |
| | 4.5 N., 96.7 E. | | |
| | Northern Sumatra. | | |
| | h: N. | | |
| | H= 07 24 49.4 | | USCGS |
| 25. | iP | NZ | 18 26 48.7 |
| | P: N,C | | |
| 25. | P | NEZ | 20 52 00 |
| | S | Z | 32 |
| 25. | P | Z | 21 18 44 |
| | S | N | 19 20 |
| 25. | eX | Z | 21 39 50 |
| 25. | L | EZ | 22 49 00 |
| | 2.1 N., 90.5 W. | | |
| | Galapagos Is. region. | | |
| | h: N. | | |
| | H= 21 53 30.7 | | USCGS |
| 26. | iP | Z | 01 19 00.5 |
| | S | N | 45 |
| 26. | L | E | 03 26.2 |
| | L | Z | 26 50 |
| | 2.0 N., 90.5 W. | | |
| | Galapagos Is. region. | | |
| | h: N. | | |
| | H= 02 30 58.4 | | USCGS |
| 26. | L | Z | 08 03 48 |

| Date | Phase | Comp. | Time(GMT) h m s |
|---|---|---|---|
| 26. | iP | Z | 10 03 46.7 |
| | iX | Z | 57.0 |
| | S | E | 04 08 |
| | X | N | 13 |
| | P: D | | |
| 26. | X | NZ | 11 46.5 |
| 26. | iP | Z | 15 48 32.5 |
| | P | NE | 33 |
| | S | NE | 50 09 |
| | P: D | | |
| | 42.6 N., 131.0 E. | | |
| | East Russia - Northeast China border region. | | |
| | h: 495 km. | | |
| | H= 15 46 31.7 | | USCGS |
| 26. | iP | Z | 23 36 46.6 |
| | iX | NE | 46.8 |
| | S | NE | 37 16 |
| | P: D | | |
| 27. | iP | NEZ | 02 17 28.3 |
| | S | NE | 18 42 |
| | P: S,W,C | | |
| | 42.4 N., 142.9 E. | | |
| | Hokkaido, Japan. | | |
| | h: 32 km. | | |
| | H= 02 15 46.3 | | USCGS |
| 27. | iP | Z | 02 55 37.5 |
| | 6.4 S., 130.1 E. | | |
| | Banda Sea. | | |
| | h: 113 km. | | |
| | H= 02 47 46.3 | | USCGS |
| 27. | P | Z | 03 20 05 |
| | iX | E | 05.6 |
| | S | N | 21 10 |
| | 39.4 N., 141.9 E. | | |
| | Honshu, Japan. | | |
| | h: 60 km. | | |
| | H= 03 18 57.3 | | JMA |
| 27. | iP | Z | 07 51 12.1 |
| | P: C | | |
| | 14.7 S., 167.7 E. | | |
| | New Hebrides Is. | | |
| | h: 39 km. | | |
| | H= 07 41 22.2 | | USCGS |
| 27. | P | NEZ | 08 01 19 |
| | S | N | 07 20 |
| | Lq | E | 09 03 |
| | 4.4 N., 126.7 E. | | |
| | Talaud Is. | | |
| | h: N. | | (cont.) |

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| Date | Phase | Comp. | Time(GMT) h m s |
|---|---|---|---|
| | H= 07 54 41.1 | | USCGS |
| 27. | ePKP | Z | 09 20 18 |
| | 21.0 S., 11.6 W. | | |
| | South Atlantic ridge. | | |
| | h: N. | | |
| | H= 09 00 32.7 | | USCGS |
| 27. | P | NEZ | 11 48 45.6 |
| | S | Z | 49 10 |
| | P: S,E,D | | |
| 27. | iP | NEZ | 14 43 05.5 |
| | S | N | 22 |
| | P: S,E,D | | |
| | 36.0 N., 139.5 E. | | |
| | Honshu, Japan. | | |
| | h: 90 km. | | |
| | H= 14 42 42.1 | | JMA |
| 27. | iP | NEZ | 15 41 22.8 |
| | P: S,E,D | | |
| | 19.9 S., 178.3 W. | | |
| | Fiji Is. region. | | |
| | h: 562 km. | | |
| | H= 15 31 07.8 | | USCGS |
| 27. | iP | Z | 19 19 17.0 |
| | iX | NE | 17.2 |
| | iS | NE | 25.6 |
| | P: C | | |
| 27. | iP | EZ | 21 30 09.8 |
| | iX | N | 10.0 |
| | S | N | 52 |
| | P: E,D | | |
| | 37.0 N., 141.5 E. | | |
| | Near east coast of Honshu, Japan. | | |
| | h: 40 km. | | |
| | H= 06 29 25.0 | | JMA |
| 27. | iP | Z | 21 50 34.5 |
| | S | NEZ | 51 |
| 28. | iP | NEZ | 02 14 49.6 |
| | S | NE | 15 11 |
| | P: S,E,D | | |
| | 36.3 N., 140.3 E. | | |
| | Near east coast of Honshu, Japan. | | |
| | h: 54 km. | | |
| | H= 02 14 22.6 | | USCGS |
| 28. | X | Z | 04 54 08 |
| | SKS | E | 05 00 10 |
| | X | NEZ | 03 46 |
| | X | Z | 28.6 |

(cont.)

| Date | Phase | Comp. | Time(GMT) h m s |
|---|---|---|---|
| | X | E | 05 29.5 |
| | Lq | E | 35.3 |
| | L | Z | 36 20 |
| | 12.8 N., 89.2 W. | | |
| | Off coast of Central America. | | |
| | h: 69 km. | | |
| | H= 04 34 42.6 | | USCGS |
| 28. | iP | NEZ | 14 28 25.2 |
| | iX | Z | 46.0 |
| | PP | Z | 29 29 |
| | PPP | E | 56 |
| | S | NZ | 33 28 |
| | Lq | NZ | 35 42 |
| | Lr | Z | 37 00 |
| | P: N,E,C | | |
| | 6.7 N., 126.6 E. | | |
| | Mindanao , P.I. | | |
| | h: 114 km. | | |
| | H= 14 22 15.0 | | USCGS |
| 28. | P | Z | 16 00 50.1 |
| | S | E | 01 18 |
| | P: C | | |
| | 34.4 N., 139.8 E. | | |
| | Near south coast of Honshu, Japan. | | |
| | h: 129 km. | | |
| | H= 16 00 09.9 | | USCGS |
| 28. | eP? | Z | 17 45 40 |
| | S | N | 46 22 |
| | L | NE | 47 30 |
| | L | Z | 48 12 |
| 28. | P | Z | 20 34 13 |
| | S | NE | 20 |
| | iX | E | 44.9 |
| 28. | P | Z | 21 35 35 |
| | X | Z | 36 07 |
| | S? | N | 44.4 |
| | L | Z | 56.0 |
| | 22.3 S., 170.6 E. | | |
| | Loyalty Is. region. | | |
| | h: 33 km. | | |
| | H= 21 24 50.7 | | USCGS |
| 28. | P | Z | 22 51 17 |
| | S | E | 38 |
| | S | N | 39 |
| 28. | ScS | N | 22 53 10 |
| | X | N | 23 02.0 |
| | Lq | E | 04.2 |
| | 32.3 N., 56.1 E. | | |
| | Iran. | | |
| | h:N. | | |
| | H= 22 32 16.2 | | USCGS |

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| Date | Phase | Comp. | Time(GMT) h m s |
|---|---|---|---|
| 29. | iP | Z | 00 51 16.4 |
| | S | N | 28 |
| | iS | E | 29.0 |
| | P: D | | |
| 29. | P | NEZ | 02 26 02 |
| | X | N | 11 |
| | X | Z | 13 |
| | S? | E | 55 |
| 29. | iP | Z | 02 38 35.0 |
| | S | NE | 49 |
| 29. | P | Z | 02 52 28 |
| | X | N | 37 |
| | X | N | 42 |
| | X | E | 43 |
| | S | N | 53 28 |
| | L | Z | 54 |
| 29. | X | NZ | 07 13.4 |
| 29. | iP | NEZ | 08 07 12.5 |
| | PcP | Z | 34.8 |
| | P: S,E,D | | |
| | 17.7 S., 178.7 W. | | |
| | Fiji Is. region. | | |
| | h: 585 km. | | |
| | H= 07 57 11.2 | | USCGS |
| 29. | P | Z | 10 46 02 |
| | iX | Z | 15.6 |
| | PP | Z | 49 12 |
| | S | N | 55 52 |
| | ScS | NZ | 56 40 |
| | L | NEZ | 11 07 00 |
| | Lr | NEZ | 09 56 |
| | P: N,W,C | | |
| | Mag. $6\frac{1}{4}$ - $6\frac{1}{2}$ (Mat.) | | |
| | 30.5 S., 178.2 W. | | |
| | Kermadec Is. region. | | |
| | h: 43 km. | | |
| | H= 10 34 06.5 | | USCGS |
| 29. | iP | Z | 14 41 04.7 |
| | S | N | 22 |
| | P: C | | |
| 29. | iP | NEZ | 14 45 53.4 |
| | S | NEZ | 59 |
| | P: N,E,C | | |
| 29. | eP | NZ | 17 23 04 |
| | X | N | 26 22 |
| | SKS | N | 33 40 |
| | X | E | 34 52 |
| | PS | N | 36 10 |
| | SS | NEZ | 41 32 |
| | | | (cont.) |

| Date | Phase | Comp. | Time(GMT) h m s |
|---|---|---|---|
| | Lq | E | 17 51 36 |
| | Lr | NE | 56 28 |
| | Lr | Z | 57 10 |
| | Mag. $6\frac{1}{4}$ (Mat.) | | |
| | 62.8 S., 166.3 E. | | |
| | Balleny Is. region. | | |
| | h: N. | | |
| | H= 17 09 13.9 | | USCGS |
| 30. | P | Z | 00 05 43 |
| | S | NE | 06 00 |
| | 32.4 N., 133.0 E. | | |
| | Near Shikoku , Japan. | | |
| | h: 40 km. | | |
| | H= 00 12 24.2 | | JMA |
| 30. | P | Z | 07 42 01 |
| | PPP | N | 45 16 |
| | L | N | 53.5 |
| | 10.4 S., 117.0 E. | | |
| | South of Sumbawa Is. | | |
| | h: 15 km. | | |
| | H= 07 33 01.8 | | USCGS |
| 30. | iP | Z | 08 59 37.1 |
| | P: C | | |
| | 26.9 N., 92.6 E. | | |
| | Eastern India. | | |
| | h: 64 km. | | |
| | H= 08 51 56.7 | | USCGS |
| 30. | P | Z | 09 42 36 |
| | X | N | 48 |
| | L | N | 45 28 |
| | 45.6 N., 151.2 E. | | |
| | Kurile Is. | | |
| | h: 48 km. | | |
| | H= 09 39 27.2 | | USCGS |
| 30. | P | Z | 10 57 55 |
| 30. | L | N | 13 54.0 |
| 30. | eP | Z | 18 30 27 |
| | Lq | N | 41 20 |
| | 9.3 S., 120.1 E. | | |
| | Sumba Is. region. | | |
| | h: 32 km. | | |
| | H= 18 21 36.5 | | USCGS |
| 30. | PKP | Z | 20 22 55 |
| | 16.1 S., 73.8 W. | | |
| | Near coast of Peru. | | |
| | h: 66 km. | | |
| | H= 20 03 23.6 | | USCGS |
| 30. | L | N | 21 12 50 |

Mineo Takehana

Director