

LAMONT GEOLOGICAL OBSERVATORY  
COLUMBIA UNIVERSITY  
PALISADES, NEW YORK



SEISMOLOGICAL BULLETIN

By

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1 January 1961 - 30 April 1961

L.G.O. Contribution No. 502



## STATION CONSTANTS

Latitude: 41° 00' 25" North  
 Longitude: 73° 54' 31" West  
 Elevation: 102.59 meters  
 Bedrock: Palisades diabase Triassic Age

## Abbreviations

i = sudden beginning of the motion (impetus)  
 e = gradual beginning of the motion (emersio)  
 Lg = short period continental surface shear wave  
 Rg = continental Rayleigh wave  
 Comp. = compression  
 Dil. = dilatation

All times are G. C. T.

Time - I. B. M. Invar pendulum clock corrected by Naval Observatory time signals every six hours.

## METHOD OF COMPUTING MAGNITUDES AT PALISADES

Magnitudes at Palisades are computed from Gutenberg's<sup>1</sup> formula:

$$M \text{ (magnitude)} = \log A - \log B + C + D$$

where

A = the maximum amplitude in microns for surface waves with periods of about 20 seconds. If the horizontal ground motion is used, A is obtained from the square root of the sum of the squares of the maximum ground amplitudes on the E-W and the N-S recordings.

In the rare cases where horizontal component instruments are not available, the vertical component alone is used. In general, records from the wide-band, long-period instruments with pendulum periods of 30 seconds and galvanometer periods of 100 seconds are used. In special cases where instruments of  $T_0 = 15$  sec,  $T_g = 75$  sec are used, the readings are preceded by an asterisk.

- log B is determined from tables by Gutenberg of - log B for varying epicentral distances.

C and D are presently taken as 0 for Palisades. C is a station constant, D depends on depth of focus, radiation pattern, absorption, and irregularities.

At present magnitudes are computed only for shallow shocks.

1. Gutenberg, B. Amplitudes of surface waves and magnitudes of shallow earthquakes. Bulletin of Seismological Society of America, Vol. 35, No. 1, January 1945.

Instruments

Three component Columbia University seismographs.  
 $T_0 = 12$  sec.,  $T_g = 15$  sec.

Three component Benioff seismographs. Short-period,  $T_0 = 1$  sec.,  
 $T_g = 0.2$  sec. Long-period,  $T_0 = 1$  sec.,  $T_g = 75$  sec.

One Columbia University vertical seismograph.  $T_0 = .33$  sec.,  
 $T_g = 0.2$  sec.

Three component Columbia University visual recording seismographs,  
 $T_0 = 12$  sec.

One Columbia University vertical seismograph for visual recording,  
 $T_0 = 1$  sec.

Three component Columbia University long-period seismographs,  
 $T_0 = 15$  sec.,  $T_g = 75$  sec.

Three component Columbia University long-period seismographs,  
 $T_0 = 30$  sec.,  $T_g = 100$  sec.

Three component Columbia University long-period seismographs, (1)  
 $T_0 = 30$  sec.,  $T_g = 100$  sec.  $P_2$  to 20 September, 1960.

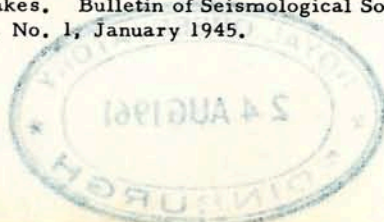
Z component  $T_0 = 30$  sec.,  $T_g = 100$  sec.  $P_2$  from 20 September,  
 1960 to 31 December, 1960.

Three component Columbia University long-period seismographs, (2)  
 $T_0 = 30$  sec.,  $T_g = 100$  sec.  $P_{2F}$  from 20 September, 1960 to  
 31 December, 1960.

Two Columbia University microbarographs,  $T_0 = 10$  sec.,  $T_g = 75$  sec.

(1) Seismographs of High Magnification at Long Periods. G. Sutton and J. Oliver. Annales de Geophysique, Tome 15, No. 4, 1959, p. 423-433.

(2) The Use of Galvanometers as Band-rejection Filters in Electromagnetic Seismographs. P. W. Pomeroy and G.H. Sutton. Seism. Soc. Amer. Bull., v. 50, p. 135-151.



| Palisades, New York |                              |          | 1      |                             |          | 1961 |  |  |
|---------------------|------------------------------|----------|--------|-----------------------------|----------|------|--|--|
| Date                | Phase                        | h m s    | Date   | Phase                       | h m s    |      |  |  |
| Jan. 1              | eLR                          | 21 51 06 | Jan. 3 | e                           | 12 23 36 |      |  |  |
|                     |                              |          |        | eLR                         | 12 34 06 |      |  |  |
|                     | 2 eS                         | 03 39 36 |        | Banda Sea                   |          |      |  |  |
|                     | eSS                          | 03 45 16 |        |                             |          |      |  |  |
|                     | eLQ                          | 03 51 06 | 3      | eLR                         | 18 40 06 |      |  |  |
|                     | eLR                          | 03 56 06 |        | New Britain                 |          |      |  |  |
|                     | Off coast Chile              |          |        |                             |          |      |  |  |
|                     | USCGS 03 16 41.0             |          | 5      | iP                          | 14 17 12 |      |  |  |
|                     | 41.4°S 88.8°W Dist. 82.7°    |          |        | P (Z) 9 sec 5 mic comp NW   |          |      |  |  |
|                     | Depth 25 km                  |          |        | epP                         | 14 17 15 |      |  |  |
|                     |                              |          |        | ePP                         | 14 19 34 |      |  |  |
|                     | 2 eP                         | 10 27 06 |        | ePPP                        | 14 21 10 |      |  |  |
|                     | ePKP                         | 10 30 34 |        | iS                          | 14 25 50 |      |  |  |
|                     | ePP                          | 10 31 58 |        | ePS                         | 14 26 22 |      |  |  |
|                     | eSKKKS                       | 10 39 56 |        | ePPS                        | 14 26 54 |      |  |  |
|                     | eScSP                        | 10 41 42 |        | eScS                        | 14 27 06 |      |  |  |
|                     | ePS                          | 10 42 18 |        | eSS                         | 14 30 24 |      |  |  |
|                     | ePKKS                        | 10 44 38 |        | eLQ                         | 14 35 46 |      |  |  |
|                     | eSS                          | 10 48 18 |        | eLR (NW)                    | 14 39 06 |      |  |  |
|                     | eSKKKS                       | 10 51 36 |        | Aleutian Islands            |          |      |  |  |
|                     | eLQ                          | 11 01 46 |        | USCGS 14 06 25.8            |          |      |  |  |
|                     | eLR (WNW)                    | 11 08 06 |        | 51.6°N 176.3°W Dist. 65.4°  |          |      |  |  |
|                     | eLQ <sub>2</sub>             | 12 02 06 |        | Depth 37 km Mag 6 1/4-6 1/2 |          |      |  |  |
|                     | eLR <sub>2</sub>             | 12 04 46 |        | Z 35, E 40, N 45*           |          |      |  |  |
|                     | Santa Cruz Islands           |          |        |                             |          |      |  |  |
|                     | USCGS 10 11 56.9             |          | 5      | ePKP                        | 16 12 58 |      |  |  |
|                     | 12.4°S 166.4°E Dist. 120.4°  |          |        | epPKP                       | 16 13 37 |      |  |  |
|                     | Depth 161 km Mag 6 1/4-6 1/2 |          |        | ePKS <sub>1</sub>           | 16 16 09 |      |  |  |
|                     | Z 16, E 21, N 14             |          |        | ePKS <sub>2</sub>           | 16 16 13 |      |  |  |
|                     |                              |          |        | e (pPKS)                    | 16 16 21 |      |  |  |
|                     | 2 eLQ                        | 21 46 06 |        | ePPP                        | 16 17 13 |      |  |  |
|                     | eLR                          | 21 54 06 |        | ePS                         | 16 25 49 |      |  |  |
|                     | New Britain region           |          |        | e (ScSPKP)                  | 16 28 33 |      |  |  |
|                     |                              |          |        | eSS                         | 16 33 05 |      |  |  |
|                     | 3 eLR (NW)                   | 00 09 26 |        | eLQ                         | 16 48 05 |      |  |  |
|                     | Solomon Islands              |          |        | eLR (NW)                    | 16 54 25 |      |  |  |
|                     |                              |          |        | New Guinea                  |          |      |  |  |
|                     | 3 eLR                        | 01 43 36 |        | USCGS 15 53 56.0            |          |      |  |  |
|                     |                              |          |        | 4.1°S 143.0°E Dist. 130.4°  |          |      |  |  |
|                     | 3 eLQ                        | 06 59 16 |        | Depth 108 km Mag 6          |          |      |  |  |
|                     | eLR (S)                      | 07 04 06 |        | Z 8, E 7, N 10              |          |      |  |  |
|                     |                              |          |        |                             |          |      |  |  |
|                     | 3 eS                         | 08 28 26 | 5      | ePKP                        | 18 16 44 |      |  |  |
|                     | eLQ                          | 08 34 26 |        | ePP                         | 18 18 29 |      |  |  |
|                     | eLR (SE)                     | 08 36 36 |        | ePKS                        | 18 19 57 |      |  |  |
|                     | Mid-Atlantic Ocean           |          |        | eSKS                        | 18 23 45 |      |  |  |
|                     | USCGS 08 10 40.4             |          |        | eSKKS                       | 18 25 25 |      |  |  |
|                     | 1.1°N 29.2°W Dist. 56.8°     |          |        | ePKKP                       | 18 27 25 |      |  |  |
|                     | Depth 25 km                  |          |        | ePS                         | 18 28 25 |      |  |  |
|                     |                              |          |        | ePPS                        | 18 29 57 |      |  |  |
|                     | 3 eLQ                        | 08 58 36 |        | eSS                         | 18 35 25 |      |  |  |
|                     | eLR                          | 09 05 46 |        | eLQ                         | 18 49 45 |      |  |  |
|                     |                              |          |        | eLR (NW)                    | 18 56 38 |      |  |  |



| Palisades, New York |   |          | 2      |                      |              | 1961 |  |  |
|---------------------|---|----------|--------|----------------------|--------------|------|--|--|
| Date                | Phase   | h m s    | Date   | Phase                | h m s        |      |  |  |
| Jan. 5              | Loyalty Islands<br>USCGS 17 57 56.6<br>21.2°S 169.3°E<br>Depth 123 km<br>Z 27, E 30, N 23 |          | Jan. 7 | eLR                  | 07 50 05     |      |  |  |
|                     |   |          | 7      | ePP                  | 18 35 37     |      |  |  |
|                     |   |          |        | ePS                  | 18 44 45     |      |  |  |
|                     |   |          |        | eSS                  | 18 50 25     |      |  |  |
|                     |   |          |        | eLQ                  | 19 00 05     |      |  |  |
| 5                   | ePKP  | 18 33 31 |        | eLR (SSE)            | 19 06 05     |      |  |  |
|                     | e (SKS)   | 18 39 35 |        | Sandwich Islands     |              |      |  |  |
|                     | ePKKS   | 18 46 45 |        | USCGS 18 16 51.2     |              |      |  |  |
|                     | eSS   | 18 50 17 |        | 57.2°S 25.3°W        | Dist. 105.9° |      |  |  |
|                     | eSKKS   | 18 52 35 |        | Depth 94 km          | Mag 5 1/2    |      |  |  |
|                     | eSSS  | 18 59 05 |        | Z 1, E 2, N 2        |              |      |  |  |
|                     | eLR (NW)  | 19 13 05 |        |                      |              |      |  |  |
|                     | Loyalty Islands<br>USCGS 18 14 43.0<br>21.0°S 169.1°E<br>Depth 124 km                     |          | 8      | e                    | 03 35 25     |      |  |  |
|                     |   |          |        | eLQ                  | 03 53 05     |      |  |  |
|                     |   |          |        | eLR (SE)             | 04 00 05     |      |  |  |
|                     |   |          | 8      | eLR (SW)             | 08 35 05     |      |  |  |
| 5                   | e   | 19 17 37 |        |                      |              |      |  |  |
|                     | eLR (SE)  | 20 01 35 | 8      | eLR                  | 21 12 05     |      |  |  |
| 6                   | eLR   | 00 19 05 | 8      | eLR                  | 22 02 05     |      |  |  |
| 6                   | eLR<br>Kermadec Islands   | 00 57 05 | 9      | eLR (SW)             | 00 09 25     |      |  |  |
| 6                   | eLR (W)   | 01 32 05 | 9      | eLR (SE)             | 03 21 45     |      |  |  |
|                     |   |          |        | North Atlantic Ocean |              |      |  |  |
|                     |   |          |        | USCGS 03 08 37.7     |              |      |  |  |
| 6                   | eLQ   | 02 02 05 |        | 31.2°N 41.0°W        | Dist. 28.2°  |      |  |  |
|                     | eLR   | 02 04 05 |        | Depth 49 km          | Mag 4 3/4    |      |  |  |
|                     | Hokkaido, Japan   |          |        | Z 5, E 7, N 3        |              |      |  |  |
| 6                   | eLR   | 05 52 05 | 9      | eLR                  | 04 11 05     |      |  |  |
| 6                   | eLQ   | 06 51 05 | 9      | eLR                  | 04 41 15     |      |  |  |
|                     | eLR   | 06 55 35 |        |                      |              |      |  |  |
|                     | Aleutian Islands  |          | 9      | eLR                  | 06 22 05     |      |  |  |
| 6                   | eLR<br>Kamchatka  | 07 52 05 | 9      | eLR (SW)             | 08 56 05     |      |  |  |
|                     |   |          |        | Kermadec             |              |      |  |  |
| 6                   | eLR (E)   | 08 56 35 | 9      | eLR (SW)             | 11 15 05     |      |  |  |
|                     |   |          |        | Z 2, E 3, N 2.5      |              |      |  |  |
| 6                   | eLR   | 10 21 05 | 9      | eP                   | 19 27 49     |      |  |  |
|                     |   |          |        | eS                   | 19 32 05     |      |  |  |
| 6                   | eLR   | 11 04 05 |        | eLQ                  | 19 33 05     |      |  |  |
|                     | South coast Mexico  |          |        | eLR (SE)             | 19 34 05     |      |  |  |
| 6                   | eLR   | 11 42 25 |        | Leward Islands       |              |      |  |  |
|                     |   |          |        | USCGS 19 22 05.6     |              |      |  |  |
| 6                   | eLR   | 13 35 05 |        | 17.8°N 61.0°W        | Dist. 25.4°  |      |  |  |
|                     |   |          |        | Depth 31 km          | Mag 4 1/2    |      |  |  |
| 6                   | eLR   | 17 03 05 |        | Z 2.0, E 3.5, N 3.0  |              |      |  |  |

| Palisades, New York |                              |                 | 3       |                      |             | 1961 |  |  |
|---------------------|------------------------------|-----------------|---------|----------------------|-------------|------|--|--|
| Date                | Phase                        | h m s           | Date    | Phase                | h m s       |      |  |  |
| Jan. 9              | eLR<br>Outer Mongolia        | 23 00 25        | Jan. 14 | eLR (W)              | 01 48 03    |      |  |  |
|                     |                              |                 | 10      | eLR                  | 03 15 05    |      |  |  |
|                     |                              |                 | 10      | eLR                  | 05 20 05    |      |  |  |
|                     |                              |                 | 10      | iP                   | 14 34 24    |      |  |  |
|                     | P (Z) 10 sec 3.5 mic comp NW |                 | 14      | eP                   | 16 48 47    |      |  |  |
|                     | epP                          | 14 34 37        |         | eS                   | 16 56 47    |      |  |  |
|                     | ePP                          | 14 37 25        |         | ePS                  | 16 57 03    |      |  |  |
|                     | ePPP                         | 14 39 37        |         | ePPS                 | 16 57 23    |      |  |  |
|                     | eS                           | 14 44 19        |         | eScS                 | 16 58 19    |      |  |  |
|                     | ePPS                         | 14 44 55        |         | eSS                  | 17 00 39    |      |  |  |
|                     | eSS                          | 14 49 31        |         | eSSS                 | 17 03 19    |      |  |  |
|                     | eSSS                         | 14 53 53        |         | eLQ                  | 17 04 03    |      |  |  |
|                     | eLQ                          | 14 56 05        |         | eLR (NW)             | 17 06 23    |      |  |  |
|                     | eLR (NW)                     | 15 00 25        |         | Unimak Island region |             |      |  |  |
|                     | Kurile Islands               |                 |         | USCGS 16 38 55.6     |             |      |  |  |
|                     | USCGS 14 22 18.2             |                 |         | 53.9°N 163.7°W       | Dist. 58.2° |      |  |  |
|                     | 49.9°N 156.2°E               | Dist. 79.3°     |         | Depth 41 km          | Mag 5 3/4   |      |  |  |
|                     | Depth 29 km                  | Mag 6 1/4-6 1/2 |         | Z 9.5, E 13, N 14.5  |             |      |  |  |
|                     | Z 22.5, E 45, N 40           |                 |         |                      |             |      |  |  |
|                     |                              |                 | 11      | eP                   | 12 10 21    |      |  |  |
|                     |                              |                 |         | epP                  | 12 10 34    |      |  |  |
|                     |                              |                 |         | ePcP                 | 12 11 20    |      |  |  |
|                     |                              |                 |         | eS                   | 12 18 48    |      |  |  |
|                     |                              |                 |         | eScS                 | 12 20 26    |      |  |  |
|                     |                              |                 |         | eSS                  | 12 23 04    |      |  |  |
|                     |                              |                 |         | eLQ                  | 12 25 54    |      |  |  |
|                     |                              |                 |         | eLR (NW)             | 12 27 56    |      |  |  |
|                     | Fox Islands, Aleutians       |                 | 15      | eS                   | 06 06 03    |      |  |  |
|                     | USCGS 11 59 55.0             |                 |         | eLR (E)              | 06 09 03    |      |  |  |
|                     | 51.8°N 171.0°W               | Dist. 62.8°     |         | Leeward Islands      |             |      |  |  |
|                     | Depth 47 km                  | Mag 5 3/4-6     |         | USCGS 05 56 15.1     |             |      |  |  |
|                     | Z 18, E 28, N 30             |                 |         | 17.4°N 61.2°W        | Dist. 26.4° |      |  |  |
|                     |                              |                 |         | Dept. 60 km          |             |      |  |  |
|                     |                              |                 | 11      | eLQ                  | 22 36 04    |      |  |  |
|                     |                              |                 |         | eLR                  | 22 44 34    |      |  |  |
|                     |                              |                 |         | MacQuarie Islands    |             |      |  |  |
|                     |                              |                 | 12      | eLR                  | 06 19 24    |      |  |  |
|                     |                              |                 |         | New Hebrides         |             |      |  |  |
|                     |                              |                 | 12      | eLQ                  | 19 51 24    |      |  |  |
|                     |                              |                 |         | eLR (SW)             | 19 55 04    |      |  |  |
|                     |                              |                 | 13      | e                    | 19 57 23    |      |  |  |
|                     |                              |                 |         | e                    | 20 02 11    |      |  |  |
|                     |                              |                 |         | eLQ                  | 20 11 03    |      |  |  |
|                     |                              |                 |         | eLR                  | 20 15 03    |      |  |  |
|                     |                              |                 | 14      | e                    | 20 19 13    |      |  |  |
|                     |                              |                 |         | e                    | 20 19 35    |      |  |  |
|                     |                              |                 | 15      | eLQ                  | 02 06 33    |      |  |  |
|                     |                              |                 |         | eLR (SW)             | 02 15 33    |      |  |  |
|                     |                              |                 | 15      | eLR                  | 05 05 03    |      |  |  |
|                     |                              |                 | 15      | eS                   | 06 06 03    |      |  |  |
|                     |                              |                 |         | eLR (E)              | 06 09 03    |      |  |  |
|                     |                              |                 |         | Leeward Islands      |             |      |  |  |
|                     |                              |                 |         | USCGS 05 56 15.1     |             |      |  |  |
|                     |                              |                 |         | 17.4°N 61.2°W        | Dist. 26.4° |      |  |  |
|                     |                              |                 |         | Dept. 60 km          |             |      |  |  |
|                     |                              |                 | 15      | eLR                  | 11 26 03    |      |  |  |
|                     |                              |                 | 15      | eLR                  | 12 52 03    |      |  |  |
|                     |                              |                 | 15      | eLR                  | 17 05 51    |      |  |  |
|                     |                              |                 | 15      | ePKKP                | 17 13 03    |      |  |  |
|                     |                              |                 |         | e (PS)               | 17 15 43    |      |  |  |
|                     |                              |                 |         | e PPS                | 17 16 39    |      |  |  |
|                     |                              |                 |         | ePKKS                | 17 17 03    |      |  |  |
|                     |                              |                 |         | eScSPKP              | 17 18 13    |      |  |  |
|                     |                              |                 |         | eSS                  | 17 21 57    |      |  |  |



| Palisades, New York |                        |    |    | 4  |          |                     |    | 1961 |                   |  |  |
|---------------------|------------------------|----|----|----|----------|---------------------|----|------|-------------------|--|--|
| Date                | Phase                  | h  | m  | s  | Date     | Phase               | h  | m    | s                 |  |  |
| Jan. 15             | e (SKPPKP)             | 17 | 23 | 43 | Jan. 16  | Honshu, Japan       |    |      |                   |  |  |
| (cont'd)            | eSSS                   | 17 | 25 | 47 | (cont'd) | USCGS 12 12 34.4    |    |      |                   |  |  |
|                     | eSSS                   | 17 | 28 | 55 |          | 36.2°N 141.7°E      |    |      | Dist. 96.5°       |  |  |
|                     | eLQ                    | 17 | 36 | 27 |          | Depth 105 km        |    |      | Mag 6 1/4 - 6 1/2 |  |  |
|                     | eLR (NNW)              | 17 | 42 | 03 |          | Z 23, E 30, N 25    |    |      |                   |  |  |
|                     | Loyalty Islands region |    |    |    |          |                     |    |      |                   |  |  |
|                     | USCGS 16 44 44.8       |    |    |    | 16       | eLQ                 | 14 | 48   | 23                |  |  |
|                     | 20.4°S 169.5°E         |    |    |    |          | eLR                 | 14 | 54   | 03                |  |  |
|                     | Depth 182 km           |    |    |    |          | Honshu, Japan       |    |      |                   |  |  |
| 16                  | eS                     | 04 | 10 | 43 | 16       | eSKS                | 16 | 05   | 55                |  |  |
|                     | eLQ                    | 04 | 13 | 43 |          | eSKKS               | 16 | 06   | 19                |  |  |
|                     | eLR (SW)               | 04 | 17 | 03 |          | ePS                 | 16 | 07   | 21                |  |  |
|                     | Near coast Mexico      |    |    |    |          | eSS                 | 16 | 12   | 31                |  |  |
|                     | USCGS 03 58 52.5       |    |    |    |          | eSSS                | 16 | 18   | 23                |  |  |
|                     | 18.2°N 102.4°W         |    |    |    |          | eLQ                 | 16 | 21   | 43                |  |  |
|                     | Depth 153 km           |    |    |    |          | eLR (N)             | 16 | 27   | 03                |  |  |
|                     |                        |    |    |    |          | Honshu, Japan       |    |      |                   |  |  |
| 16                  | eP                     | 07 | 33 | 37 |          | USCGS 15 41 23.3    |    |      |                   |  |  |
|                     | ePP                    | 07 | 37 | 37 |          | 36.4°N 140.6°E      |    |      | Dist. 96.9°       |  |  |
|                     | ePPP                   | 07 | 40 | 11 |          | Depth 147 km        |    |      | Mag 6 - 6 1/4     |  |  |
|                     | ePKS                   | 07 | 42 | 17 |          | Z 10, E 28, N15     |    |      |                   |  |  |
|                     | eSKS                   | 07 | 44 | 55 |          |                     |    |      |                   |  |  |
|                     | eSKKS                  | 07 | 45 | 15 | 17       | eLQ                 | 02 | 37   | 23                |  |  |
|                     | ePS                    | 07 | 46 | 29 |          | eLR                 | 02 | 44   | 03                |  |  |
|                     | eSS                    | 07 | 51 | 43 |          |                     |    |      |                   |  |  |
|                     | eLQ                    | 07 | 59 | 03 | 17       | eLQ                 | 08 | 56   | 03                |  |  |
|                     | eLR (N)                | 08 | 05 | 03 |          | eLR                 | 09 | 00   | 03                |  |  |
|                     | Honshu, Japan          |    |    |    |          |                     |    |      |                   |  |  |
|                     | USCGS 07 20 18.6       |    |    |    | 17       | eLR                 | 14 | 27   | 03                |  |  |
|                     | 36.0°N 141.1°E         |    |    |    |          |                     |    |      |                   |  |  |
|                     | Depth 131 km           |    |    |    | 17       | e                   | 18 | 36   | 42                |  |  |
|                     | Mag 6 1/2-6 3/4        |    |    |    |          | eLQ                 | 18 | 55   | 22                |  |  |
|                     | Z 32, E 60, N 50       |    |    |    |          | eLR (W)             | 19 | 02   | 02                |  |  |
| 16                  | eSKKS                  | 11 | 44 | 33 | 17       | ePP                 | 23 | 26   | 18                |  |  |
|                     | eLQ                    | 12 | 01 | 03 |          | ePS                 | 23 | 35   | 54                |  |  |
|                     | eLR (N)                | 12 | 05 | 03 |          | ePPS                | 23 | 37   | 52                |  |  |
|                     | Honshu, Japan          |    |    |    |          | eSS                 | 23 | 43   | 02                |  |  |
|                     | USCGS 11 19 46.5       |    |    |    |          | e                   | 23 | 47   | 02                |  |  |
|                     | 35.7°N 140.6°E         |    |    |    |          | eLQ                 | 23 | 55   | 18                |  |  |
|                     | Depth 157 km           |    |    |    |          | eLR (NW)            | 23 | 59   | 22                |  |  |
|                     |                        |    |    |    |          | Loyalty Islands     |    |      |                   |  |  |
|                     |                        |    |    |    |          | USCGS 23 05 32.5    |    |      |                   |  |  |
|                     |                        |    |    |    |          | 21.4°S 169.3°E      |    |      | Dist. 123.7°      |  |  |
|                     |                        |    |    |    |          | Depth 84 km         |    |      | Mag 5 1/2         |  |  |
|                     |                        |    |    |    |          | Z 2.5, E 3.5, N 2.0 |    |      |                   |  |  |
| 16                  | eSKS                   | 12 | 37 | 15 | 18       | e (L)               | 08 | 05   | 02                |  |  |
|                     | ePS                    | 12 | 38 | 41 |          | Honshu, Japan       |    |      |                   |  |  |
|                     | eSS                    | 12 | 44 | 03 |          |                     |    |      |                   |  |  |
|                     | eSSS                   | 12 | 49 | 35 |          |                     |    |      |                   |  |  |
|                     | eLQ                    | 12 | 53 | 03 |          |                     |    |      |                   |  |  |
|                     | eLR (N)                | 12 | 58 | 03 |          |                     |    |      |                   |  |  |
|                     | (continued)            |    |    |    |          |                     |    |      |                   |  |  |

| Palisades, New York |                             |    |    | 5  |          |                           |    | 1961 |              |  |  |
|---------------------|-----------------------------|----|----|----|----------|---------------------------|----|------|--------------|--|--|
| Date                | Phase                       | h  | m  | s  | Date     | Phase                     | h  | m    | s            |  |  |
| Jan. 18             | eLQ                         | 08 | 21 | 52 | Jan. 20  | eLQ                       | 02 | 08   | 32           |  |  |
|                     | eLR                         | 08 | 28 | 02 | (cont'd) | eLR (W)                   | 02 | 10   | 22           |  |  |
|                     | Honshu, Japan               |    |    |    |          | Off coast Mexico          |    |      |              |  |  |
|                     |                             |    |    |    |          | USCGS 01 51 56.6          |    |      |              |  |  |
| 18                  | eLR (NW)                    | 10 | 07 | 02 |          | 20.3°N 108.6°W            |    |      | Dist. 36.4°  |  |  |
|                     | New Hebrides                |    |    |    |          | Depth 84 km               |    |      | Mag 4 3/4    |  |  |
|                     |                             |    |    |    |          | Z 2.5, E 2.5, N 5.0       |    |      |              |  |  |
| 18                  | eLQ                         | 16 | 04 | 22 | 20       | eLR                       | 05 | 51   | 32           |  |  |
|                     | eLR (W)                     | 16 | 07 | 02 |          | Kodiak, Alaska            |    |      |              |  |  |
|                     | Tonga Islands               |    |    |    |          |                           |    |      |              |  |  |
| 18                  | eLQ                         | 21 | 42 | 12 | 20       | eLR                       | 08 | 39   | 02           |  |  |
|                     | eLR (W)                     | 21 | 45 | 02 |          |                           |    |      |              |  |  |
| 19                  | ePS                         | 04 | 51 | 30 | 20       | eLR                       | 14 | 01   | 42           |  |  |
|                     | eSS                         | 04 | 59 | 02 |          | Kodiak Islands, Alaska    |    |      |              |  |  |
|                     | eSKKS                       | 05 | 02 | 42 |          |                           |    |      |              |  |  |
|                     | eSSS                        | 05 | 07 | 38 | 20       | eP                        | 17 | 18   | 30           |  |  |
|                     | eLQ                         | 05 | 12 | 22 |          | eS                        | 17 | 25   | 38           |  |  |
|                     | eLR (NW)                    | 05 | 18 | 32 |          | eSS                       | 17 | 29   | 34           |  |  |
|                     | New Hebrides Islands region |    |    |    |          | eLQ                       | 17 | 32   | 32           |  |  |
|                     | USCGS 04 21 16.0            |    |    |    |          | eLR                       | 17 | 36   | 32           |  |  |
|                     | 14.4°S 166.7°E              |    |    |    |          | Kodiak, Alaska            |    |      |              |  |  |
|                     | Depth 26 km                 |    |    |    |          | USCGS 17 09 15.7          |    |      |              |  |  |
|                     | Z 2.0, E 3.5, N 2.5         |    |    |    |          | 56.4°N 152.3°W            |    |      | Dist. 51°    |  |  |
|                     |                             |    |    |    |          | Depth 46 km               |    |      | Mag 6 3/4    |  |  |
| 19                  | eLQ                         | 06 | 45 | 22 | 20       | eLR                       | 21 | 58   | 02           |  |  |
|                     | eLR (NW)                    | 06 | 52 | 02 |          | Kodiak, Alaska            |    |      |              |  |  |
|                     | Loyalty Islands             |    |    |    |          |                           |    |      |              |  |  |
| 19                  | eLR                         | 07 | 58 | 02 | 21       | eLR                       | 22 | 20   | 32           |  |  |
|                     |                             |    |    |    |          |                           |    |      |              |  |  |
| 19                  | eP                          | 17 | 34 | 22 | 22       | e (P)                     | 03 | 39   | 30           |  |  |
|                     | eS                          | 17 | 44 | 16 |          | ePP                       | 03 | 44   | 18           |  |  |
|                     | ePS                         | 17 | 44 | 42 |          | ePPP                      | 03 | 47   | 02           |  |  |
|                     | eSS                         | 17 | 50 | 22 |          | eSKS                      | 03 | 50   | 06           |  |  |
|                     | eSSS                        | 17 | 54 | 10 |          | ePS                       | 03 | 54   | 18           |  |  |
|                     | eLQ                         | 17 | 56 | 02 |          | ePPS                      | 03 | 56   | 02           |  |  |
|                     | eLR (NW)                    | 18 | 01 | 02 |          | eSS                       | 04 | 00   | 42           |  |  |
|                     | Kurile Islands              |    |    |    |          | eSSS                      | 04 | 05   | 02           |  |  |
|                     | USCGS 17 22 16.9            |    |    |    |          | eLQ                       | 04 | 14   | 02           |  |  |
|                     | 49.7°N 155.8°E              |    |    |    |          | eLR (NW)                  | 04 | 20   | 02           |  |  |
|                     | Depth 31 km                 |    |    |    |          | eLR <sub>2</sub> (SE)     | 05 | 16   | 32           |  |  |
|                     | Z 2.5, E 4.0, N 3.5         |    |    |    |          | Santa Cruz Islands region |    |      |              |  |  |
|                     |                             |    |    |    |          | USCGS 03 24 04.5          |    |      |              |  |  |
|                     |                             |    |    |    |          | 11.9°S 166.2°E            |    |      | Dist. 120.4° |  |  |
|                     |                             |    |    |    |          | Depth 25 km               |    |      | Mag 7 1/4    |  |  |
|                     |                             |    |    |    |          | Z 72, E 105, N 75         |    |      |              |  |  |
| 19                  | eLR                         | 21 | 23 | 02 | 22       | eLR                       | 13 | 52   | 02           |  |  |
|                     |                             |    |    |    |          |                           |    |      |              |  |  |
| 20                  | eLR                         | 01 | 25 | 02 | 22       | eLR                       | 14 | 39   | 02           |  |  |
|                     | Kodiak, Alaska              |    |    |    |          |                           |    |      |              |  |  |
| 20                  | eS                          | 02 | 04 | 18 |          |                           |    |      |              |  |  |
|                     | ePcS                        | 02 | 05 | 02 |          |                           |    |      |              |  |  |
|                     | eSS                         | 02 | 07 | 12 |          |                           |    |      |              |  |  |

| Palisades, New York |                          |              | 6       |                    |              | 1961 |  |  |
|---------------------|--------------------------|--------------|---------|--------------------|--------------|------|--|--|
| Date                | Phase                    | h m s        | Date    | Phase              | h m s        |      |  |  |
| Jan. 22             | eLQ                      | 16 57 32     | Jan. 25 | ePS                | 05 51 54     |      |  |  |
|                     | eLR                      | 17 05 22     |         | eSS                | 05 58 22     |      |  |  |
|                     | Kermadec                 |              |         | eLQ                | 06 12 02     |      |  |  |
| 22                  | eP                       | 19 20 02     |         | eLR (NW)           | 06 18 02     |      |  |  |
|                     | eSS                      | 19 42 10     |         | New Hebrides       |              |      |  |  |
|                     | eSKKKS                   | 19 44 02     |         | USCGS 05 21 42.2   |              |      |  |  |
|                     | e (SSS)                  | 19 51 02     |         | 14.1°S 165.4°E     | Dist. 122.4* |      |  |  |
|                     | eLR                      | 19 56 42     |         | Depth 195 km       | Mag 5 1/2    |      |  |  |
|                     | Santa Cruz Islands       |              |         | Z 3.5 E 4.0, N 3.0 |              |      |  |  |
|                     | USCGS 19 04 54.1         |              | 25      | eLQ                | 07 14 02     |      |  |  |
|                     | 12.3°S 166.1°E           | Dist. 120.4* |         | eLR (SE)           | 07 16 02     |      |  |  |
|                     | Depth 35 km              |              | 25      | e                  | 17 20 03     |      |  |  |
| 23                  | eLR                      | 04 44 02     |         | e                  | 17 30 43     |      |  |  |
| 23                  | eSKS                     | 05 11 42     |         | eLQ                | 17 33 03     |      |  |  |
|                     | ePS                      | 05 13 10     |         | eLR (NW)           | 17 36 43     |      |  |  |
|                     | eLQ                      | 05 26 22     | 25      | eLR                | 18 33 03     |      |  |  |
|                     | eLR                      | 05 31 02     |         | Celebes            |              |      |  |  |
|                     | Hokkaido, Japan          |              | 25      | eP                 | 19 16 22     |      |  |  |
|                     | USCGS 04 48 21.4         |              |         | eS                 | 19 26 33     |      |  |  |
|                     | 42.9°N 145.3°E           | Dist. 89.3*  |         | eLQ                | 19 39 03     |      |  |  |
|                     | Depth 46 km              |              |         | eLR (NW)           | 19 42 03     |      |  |  |
| 24                  | ePS                      | 07 55 12     |         | Kurile Islands     |              |      |  |  |
|                     | ePKKS                    | 07 57 14     |         | USCGS 19 04 22.8   |              |      |  |  |
|                     | eSS                      | 08 02 10     |         | 49.8°N 156.0°E     | Dist. 79.3*  |      |  |  |
|                     | eLQ                      | 08 15 32     |         | Depth 98 km        |              |      |  |  |
|                     | eLR (NW)                 | 08 21 42     | 25      | eLR                | 21 45 03     |      |  |  |
|                     | New Hebrides             |              | 25      | eLR                | 23 52 03     |      |  |  |
|                     | USCGS 07 25 03.5         |              | 26      | eLQ                | 06 54 03     |      |  |  |
|                     | 15.6°S 167.6°E           | Dist. 121.4* |         | eLR (NW)           | 07 00 03     |      |  |  |
|                     | Depth 198 km             |              |         | New Hebrides       |              |      |  |  |
| 24                  | eLQ                      | 09 03 02     | 26      | e                  | 11 04 23     |      |  |  |
|                     | eLR (SW)                 | 09 11 42     |         | eLR (NW)           | 11 27 23     |      |  |  |
|                     | Antarctic Ocean          |              |         | Santa Cruz Islands |              |      |  |  |
| 24                  | e                        | 23 25 02     | 26      | eLR (NW)           | 14 14 33     |      |  |  |
|                     | eLQ                      | 23 27 02     |         | Loyalty Islands    |              |      |  |  |
|                     | eLR (S)                  | 23 29 02     | 26      | ePP                | 16 33 51     |      |  |  |
|                     | Panama-Costa Rica border |              |         | ePKS               | 16 35 23     |      |  |  |
|                     | USCGS 23 12 49.0         |              |         | eSKS               | 16 39 21     |      |  |  |
|                     | 8.3°N 82.9°W             | Dist. 33.8*  |         | eSKKS              | 16 40 53     |      |  |  |
|                     | Depth 78 km              |              |         | eScSP              | 16 43 25     |      |  |  |
|                     | Z 2.0, E 3.0, N 2.5      |              |         | (continued)        |              |      |  |  |
| 25                  | eLR (NE)                 | 02 11 02     |         |                    |              |      |  |  |

| Palisades, New York |                        |                 | 7        |                        |              | 1961 |  |  |
|---------------------|------------------------|-----------------|----------|------------------------|--------------|------|--|--|
| Date                | Phase                  | h m s           | Date     | Phase                  | h m s        |      |  |  |
| Jan. 26             | ePS                    | 16 44 03        | Jan. 28  | Kern Co., Calif.       |              |      |  |  |
| (cont'd)            | ePPS                   | 16 45 23        | (cont'd) | USCGS 08 12 45.3       |              |      |  |  |
|                     | ePKKS                  | 16 46 17        |          | 35.5°N 118.1°W         | Dist. 34.5   |      |  |  |
|                     | eSS                    | 16 51 23        |          | Depth 21 km            | Mag 4 3/4    |      |  |  |
|                     | e (PKPPKS)             | 16 54 51        |          | Z -, E -, N 4.5        |              |      |  |  |
|                     | eSSS                   | 16 56 03        | 28       | eLQ                    | 14 44 43     |      |  |  |
|                     | e (PKPSKS)             | 16 58 43        |          | eLR (NW)               | 14 49 03     |      |  |  |
|                     | eLQ                    | 17 05 03        | 28       | eLQ                    | 15 13 23     |      |  |  |
|                     | eLR (WNW)              | 17 10 51        |          | eLR                    | 15 19 33     |      |  |  |
|                     | eLR <sub>2</sub> (ESE) | 18 04 03        |          | New Hebrides           |              |      |  |  |
|                     | Loyalty Islands        |                 | 28       | ePP                    | 20 03 36     |      |  |  |
|                     | USCGS 16 13 25.1       |                 |          | ePKS                   | 20 05 10     |      |  |  |
|                     | 21.4°S 169.5°E         | Dist. 122.9*    |          | eSKS                   | 20 09 08     |      |  |  |
|                     | Depth 119 km           | Mag 6 1/4-6 1/2 |          | ePKKP                  | 20 11 48     |      |  |  |
|                     | Z 15, E 25, N 10       |                 |          | ePPS                   | 20 14 52     |      |  |  |
| 26                  | eLR (NW)               | 19 47 33        |          | ePKKS                  | 20 15 24     |      |  |  |
|                     | Loyalty Islands        |                 |          | e                      | 20 16 14     |      |  |  |
| 27                  | eLQ                    | 01 46 03        |          | eSS                    | 20 20 32     |      |  |  |
|                     | eLR (NW)               | 01 52 03        |          | e                      | 20 23 32     |      |  |  |
|                     | Solomon Islands        |                 |          | eSSS                   | 20 25 24     |      |  |  |
| 27                  | eLR                    | 02 50 03        |          | e                      | 20 28 20     |      |  |  |
| 27                  | eLQ                    | 14 50 03        |          | eLQ                    | 20 34 44     |      |  |  |
|                     | eLR                    | 14 58 03        |          | eLR (WNW)              | 20 43 04     |      |  |  |
|                     | New Ireland region     |                 |          | Loyalty Islands region |              |      |  |  |
| 27                  | eLQ                    | 15 46 23        |          | USCGS 19 43 01.4       |              |      |  |  |
|                     | eLR (NW)               | 15 50 03        |          | 21.3°S 169.5°E         | Dist. 122.9* |      |  |  |
|                     | Loyalty Islands        |                 |          | Depth 50 km            | Mag 6 1/4    |      |  |  |
| 28                  | eP                     | 03 34 06        |          | Z 7, E 10, N 5.5       |              |      |  |  |
|                     | epP                    | 03 34 22        | 29       | e                      | 00 53 34     |      |  |  |
|                     | eS                     | 03 41 43        | 29       | eLR                    | 01 48 04     |      |  |  |
|                     | ePS                    | 03 42 03        |          | New Hebrides           |              |      |  |  |
|                     | eScS                   | 03 44 15        | 29       | eLR                    | 04 15 44     |      |  |  |
|                     | eSS                    | 03 46 43        | 29       | eLR                    | 13 54 44     |      |  |  |
|                     | eLQ                    | 03 48 03        |          | Aleutians              |              |      |  |  |
|                     | eLR (SSE)              | 03 51 33        | 30       | eLR                    | 01 06 04     |      |  |  |
|                     | Near coast Peru        |                 | 30       | eS                     | 12 28 20     |      |  |  |
|                     | USCGS 03 24 39.2       |                 |          | eSS                    | 12 31 52     |      |  |  |
|                     | 13.6°S 76.6°W          | Dist. 54.8*     |          | eLQ                    | 12 32 44     |      |  |  |
|                     | Depth 35 km            | Mag 5           |          | eLR (NNW)              | 12 35 04     |      |  |  |
|                     | Z 4, E 3, N 5          |                 |          | Lg                     | 12 37 34     |      |  |  |
| 28                  | eS                     | 08 25 23        |          | Rg                     | 12 40 32     |      |  |  |
|                     | eLQ                    | 08 30 43        |          | (continued)            |              |      |  |  |
|                     | eLR (W)                | 08 32 33        |          |                        |              |      |  |  |
|                     | (continued)            |                 |          |                        |              |      |  |  |





| Palisades, New York |                              |              | 10     |                    |              | 1961 |  |  |
|---------------------|------------------------------|--------------|--------|--------------------|--------------|------|--|--|
| Date                | Phase                        | h m s        | Date   | Phase              | h m s        |      |  |  |
| Feb. 6              | eP                           | 12 23 01     | Feb. 7 | eLR (NW)           | 03 58 04     |      |  |  |
|                     | eS                           | 12 31 40     |        | Santa Cruz Islands |              |      |  |  |
|                     | ePS                          | 12 32 04     |        |                    |              |      |  |  |
|                     | eScS                         | 12 32 54     | 7      | eLR                | 04 59 04     |      |  |  |
|                     | eSS                          | 12 36 04     |        | Santa Cruz Islands |              |      |  |  |
|                     | eLQ                          | 12 39 04     |        |                    |              |      |  |  |
|                     | eLR (NW)                     | 12 42 04     | 7      | eLR                | 06 28 34     |      |  |  |
|                     | Andreanof Islands, Aleutians |              |        | Sumatra            |              |      |  |  |
|                     | USCGS 12 12 26.0             |              |        |                    |              |      |  |  |
|                     | 51.6°N 174.8°W               | Dist. 64.9°  | 7      | eLR                | 07 04 04     |      |  |  |
|                     | Depth 77 km                  |              |        | Santa Cruz Islands |              |      |  |  |
|                     | Mag 5 1/4-5 1/2              |              |        |                    |              |      |  |  |
|                     | Z 4, E 5, N 6                |              |        |                    |              |      |  |  |
| 6                   | eP                           | 18 28 01     |        |                    |              |      |  |  |
|                     | eS                           | 18 38 40     | 7      | eLR                | 15 08 04     |      |  |  |
|                     | eLQ                          | 18 53 44     |        | Honshu, Japan      |              |      |  |  |
|                     | eLR                          | 18 58 44     |        |                    |              |      |  |  |
|                     | Kurile Islands               |              | 7      | eLQ                | 16 29 35     |      |  |  |
|                     | USCGS 18 15 21.6             |              |        | eLR                | 16 36 05     |      |  |  |
|                     | 44.8°N 149.1°E               | Dist. 86.1°  |        | Formosa            |              |      |  |  |
|                     | Depth 25 km                  |              |        |                    |              |      |  |  |
| 6                   | eLQ                          | 21 28 04     | 7      | eS                 | 23 46 45     |      |  |  |
|                     | eLR                          | 21 32 04     |        | ePS                | 23 47 05     |      |  |  |
|                     |                              |              |        | eLQ                | 23 55 35     |      |  |  |
|                     |                              |              |        | eLR (NW)           | 00 00 19     |      |  |  |
| 6                   | eP                           | 22 00 44     |        | Aleutians          |              |      |  |  |
|                     | ePKP                         | 22 04 07     |        | USCGS 23 27 10.8   |              |      |  |  |
|                     | epPKP                        | 22 04 21     |        | 51.4°N 177.2°W     | Dist. 66.5°  |      |  |  |
|                     | ePP                          | 22 05 52     |        | Depth 15 km        |              |      |  |  |
|                     | ePKS                         | 22 07 24     |        |                    |              |      |  |  |
|                     | eSKS                         | 22 11 12     | 8      | ePS                | 03 07 25     |      |  |  |
|                     | eSKKS                        | 22 12 56     |        | eSS                | 03 14 13     |      |  |  |
|                     | ePPS                         | 22 17 24     |        | e                  | 03 20 05     |      |  |  |
|                     | eSS                          | 22 23 00     |        | e                  | 03 22 05     |      |  |  |
|                     | eSSS                         | 22 26 44     |        | eLQ                | 03 27 45     |      |  |  |
|                     | eLQ                          | 22 35 04     |        | eLR                | 03 33 45     |      |  |  |
|                     | eLR (NW)                     | 22 43 04     |        | New Hebrides       |              |      |  |  |
|                     | eLR <sub>2</sub> (SE)        | 23 36 04     |        | USCGS 02 36 40.5   |              |      |  |  |
|                     | Solomon Islands              |              |        | 15.3°S 167.5°E     | Dist. 120.8° |      |  |  |
|                     | USCGS 21 45 13.5             |              |        | Depth 162 km       |              |      |  |  |
|                     | 6.8°S 155.3°E                | Dist. 124.9° |        |                    |              |      |  |  |
|                     | Depth 59 km                  |              | 8      | eP                 | 08 12 24     |      |  |  |
| 6                   | e                            | 22 41 25     |        | epP                | 08 14 17     |      |  |  |
|                     | e                            | 22 41 47     |        | ePP                | 08 17 25     |      |  |  |
|                     |                              |              |        | eS                 | 08 18 49     |      |  |  |
|                     |                              |              |        | esS                | 08 22 25     |      |  |  |
|                     |                              |              |        | e (S)              | 08 27 05     |      |  |  |
| 7                   | eLR (NW)                     | 01 55 04     |        | Brazil-Peru border |              |      |  |  |
|                     |                              |              |        | USCGS 08 04 13.8   |              |      |  |  |
| 7                   | eLR (NW)                     | 02 42 04     |        | 10.6°S 71.0°W      | Dist. 51.8°  |      |  |  |
|                     | Santa Cruz Islands           |              |        | Depth 669 km       |              |      |  |  |
| 7                   | eLR (SW)                     | 03 36 04     |        |                    |              |      |  |  |

| Palisades, New York |                        |              | 11      |                        |              | 1961 |  |  |
|---------------------|------------------------|--------------|---------|------------------------|--------------|------|--|--|
| Date                | Phase                  | h m s        | Date    | Phase                  | h m s        |      |  |  |
| Feb. 8              | eLR                    | 18 19 06     | Feb. 11 | eS                     | 11 46 44     |      |  |  |
|                     | Tonga Islands          |              |         | eLR                    | 11 53 06     |      |  |  |
| 9                   | eLR                    | 01 01 06     |         | Argentina              |              |      |  |  |
|                     | Solomon Islands        |              |         | USCGS 11 27 59.4       |              |      |  |  |
|                     |                        |              |         | 23.3°S 65.9°W          | Dist. 64.1°  |      |  |  |
|                     |                        |              |         | Depth 195 km           |              |      |  |  |
| 9                   | eP                     | 02 23 36     |         |                        |              |      |  |  |
|                     | ePKP                   | 02 27 06     | 11      | ePKP                   | 21 19 49     |      |  |  |
|                     | ePP                    | 02 28 14     |         | ePP                    | 21 21 02     |      |  |  |
|                     | eSKS                   | 02 33 42     |         | eSKS                   | 21 26 38     |      |  |  |
|                     | eSKKS                  | 02 35 10     |         | eSKKS                  | 21 27 54     |      |  |  |
|                     | ePKKP                  | 02 37 23     |         | ePKKP                  | 21 30 13     |      |  |  |
|                     | ePS                    | 02 38 06     |         | ePS                    | 21 30 50     |      |  |  |
|                     | ePPS                   | 02 39 18     |         | ePPS                   | 21 32 10     |      |  |  |
|                     | eSS                    | 02 44 46     |         | eSS                    | 21 37 36     |      |  |  |
|                     | eSSS                   | 02 49 06     |         | e (SKKKS)              | 21 41 16     |      |  |  |
|                     | e (SSSS)               | 02 56 26     |         | eLQ                    | 21 50 26     |      |  |  |
|                     | eLQ                    | 02 57 36     |         | eLR (WSW)              | 21 56 26     |      |  |  |
|                     | eLR (WSW)              | 03 03 36     |         | eLR <sub>2</sub> (ENE) | 22 52 06     |      |  |  |
|                     | eLR <sub>2</sub> (ENE) | 04 07 26     |         | Kermadec               |              |      |  |  |
|                     | Kermadec               |              |         | USCGS 21 01 06.4       |              |      |  |  |
|                     | USCGS 02 08 15.9       |              |         | 28.2°S 177.5°W         | Dist. 117.2° |      |  |  |
|                     | 28.2°S 177.4°W         | Dist. 117.2° |         | Depth 41 km            | Mag 6        |      |  |  |
|                     | Depth 37 km            |              |         | Z 7, E 11, N 5.5       |              |      |  |  |
|                     | Z 10, E 15, N 6.5      |              |         |                        |              |      |  |  |
| 9                   | eLR                    | 09 01 06     | 12      | eP                     | 01 31 33     |      |  |  |
|                     |                        |              |         | eS                     | 01 41 46     |      |  |  |
| 9                   | eLR                    | 20 41 10     |         | ePS                    | 01 42 34     |      |  |  |
|                     |                        |              |         | eSS                    | 01 46 46     |      |  |  |
| 9                   | eLR                    | 21 34 06     |         | eLQ                    | 01 53 26     |      |  |  |
|                     | Java                   |              |         | eLR (SW)               | 01 58 46     |      |  |  |
|                     |                        |              |         | Easter Island region   |              |      |  |  |
| 10                  | eLQ                    | 14 24 46     |         | USCGS 01 19 21.8       |              |      |  |  |
|                     | eLR                    | 14 28 36     |         | 34.8°S 106.9°W         | Dist. 81.5°  |      |  |  |
|                     | Ceram Sea              |              |         | Depth 100 km           | Mag 5        |      |  |  |
|                     |                        |              |         | Z 2, E 2, N 2.5        |              |      |  |  |
| 10                  | eLR                    | 17 30 06     | 12      | eS                     | 04 02 54     |      |  |  |
|                     |                        |              |         | eLQ                    | 04 06 14     |      |  |  |
| 11                  | eLR (NW)               | 01 56 06     |         | eLR                    | 04 09 18     |      |  |  |
|                     |                        |              |         | Mexico-Arizona border  |              |      |  |  |
| 11                  | eLR                    | 03 32 06     |         | USCGS 03 51 14.6       |              |      |  |  |
|                     | Marianas               |              |         | 31.0°N 109.1°W         | Dist. 29.9°  |      |  |  |
|                     |                        |              |         | Depth 63 km            |              |      |  |  |
| 11                  | eS                     | 06 35 54     | 12      | eLQ                    | 14 17 06     |      |  |  |
|                     | ePS                    | 06 36 12     |         | eLR                    | 14 21 06     |      |  |  |
|                     | eSS                    | 06 38 46     |         | Alaska                 |              |      |  |  |
|                     | eLQ                    | 06 43 46     |         |                        |              |      |  |  |
|                     | eLR (SE)               | 06 46 46     | 12      | eLR                    | 16 39 06     |      |  |  |
|                     |                        |              |         | Banda Sea              |              |      |  |  |

| Palisades, New York |                         |              | 12      |                           |                 | 1961 |  |  |
|---------------------|-------------------------|--------------|---------|---------------------------|-----------------|------|--|--|
| Date                | Phase                   | h m s        | Date    | Phase                     | h m s           |      |  |  |
| Feb. 12             | eP                      | 22 06 30     | Feb. 13 | eP                        | 16 40 10        |      |  |  |
|                     | iP                      | 22 06 33     |         | epP                       | 16 40 20        |      |  |  |
|                     | P (Z) 11 sec 5 mic comp |              |         | ePP                       | 16 43 44        |      |  |  |
|                     | epP                     | 22 06 44     |         | ePPP                      | 16 45 38        |      |  |  |
|                     | ePP                     | 22 09 50     |         | eS                        | 16 50 46        |      |  |  |
|                     | ePPP                    | 22 11 50     |         | eSKKS                     | 16 51 06        |      |  |  |
|                     | eSKS                    | 22 16 54     |         | ePS                       | 16 51 58        |      |  |  |
|                     | eS                      | 22 16 58     |         | eSS                       | 16 57 06        |      |  |  |
|                     | eSS                     | 22 23 50     |         | eLQ                       | 17 05 26        |      |  |  |
|                     | eLQ                     | 22 29 06     |         | eLR (NNW)                 | 17 10 06        |      |  |  |
|                     | eLR (NNW)               | 22 35 06     |         | Kurile Islands            |                 |      |  |  |
|                     | Kurile Islands          |              |         | USCGS 16 27 20.9          |                 |      |  |  |
|                     | USCGS 21 53 43.5        |              |         | 43.7°N 149.6°E            | Dist. 86.6°     |      |  |  |
|                     | 43.7°N 147.6°E          | Dist. 87.3°  |         | Depth 25 km               | Mag 5 1/2-5 3/4 |      |  |  |
|                     | Depth 45 km             | Mag 7        |         | Z 4, E 6, N 6             |                 |      |  |  |
|                     | Z 100, E 77, N 130*     |              |         |                           |                 |      |  |  |
| 12                  | eP                      | 23 39 22     | 13      | eLQ                       | 23 22 26        |      |  |  |
|                     | epP                     | 23 39 35     |         | eLR                       | 23 25 06        |      |  |  |
|                     | eS                      | 23 49 52     |         | Kurile Islands            |                 |      |  |  |
| 13                  | eLQ                     | 00 01 06     | 14      | eLQ                       | 03 23 06        |      |  |  |
|                     | eLR                     | 00 07 06     |         | eLR                       | 03 28 06        |      |  |  |
|                     | Kurile Islands          |              |         |                           |                 |      |  |  |
|                     | USCGS 23 26 34.5        |              | 14      | eP                        | 03 34 51        |      |  |  |
|                     | 44.0°N 147.7°E          | Dist. 87.3°  |         | epP                       | 03 35 04        |      |  |  |
|                     | Depth 23 km             |              |         | ePP                       | 03 37 22        |      |  |  |
|                     |                         |              |         | eS                        | 03 43 50        |      |  |  |
| 13                  | eLR                     | 04 56 06     |         | eScS                      | 03 45 18        |      |  |  |
|                     | Solomon Islands         |              |         | e (SS)                    | 03 46 22        |      |  |  |
|                     |                         |              |         | eLQ                       | 03 49 26        |      |  |  |
| 13                  | ePP                     | 07 04 36     |         | eLR (SSW)                 | 03 52 06        |      |  |  |
|                     | ePKS                    | 07 07 56     |         |                           |                 |      |  |  |
|                     | eSKS                    | 07 10 38     | 14      | eLQ                       | 04 00 26        |      |  |  |
|                     | eSKS <sub>2</sub>       | 07 11 08     |         | eLR (NW)                  | 04 06 06        |      |  |  |
|                     | eSKKS                   | 07 12 02     |         | Kurile Islands            |                 |      |  |  |
|                     | ePS                     | 07 13 44     |         |                           |                 |      |  |  |
|                     | ePPS                    | 07 14 48     | 14      | eLQ                       | 06 22 06        |      |  |  |
|                     | eSS                     | 07 19 46     |         | eLR                       | 06 27 06        |      |  |  |
|                     | eSKKS                   | 07 23 26     |         | Near coast southern Chile |                 |      |  |  |
|                     | eLQ                     | 07 30 30     | 14      | eLR (NW)                  | 16 42 06        |      |  |  |
|                     | eLR (NW)                | 07 36 26     |         | Samoa Islands region      |                 |      |  |  |
|                     | eLR <sub>2</sub> (SE)   | 08 51 06     |         |                           |                 |      |  |  |
|                     | Tonga Islands           |              | 15      | eLR (SW)                  | 00 02 06        |      |  |  |
|                     | USCGS 06 45 25.0        |              | 15      | eLR (SW)                  | 01 30 06        |      |  |  |
|                     | 17.0°S 173.7°W          | Dist. 108.4° |         |                           |                 |      |  |  |
|                     | Depth 43 km             | Mag 5 3/4-6  |         |                           |                 |      |  |  |
|                     | Z 6, E 9, N 5.5         |              |         |                           |                 |      |  |  |
| 13                  | e                       | 07 30 23     |         |                           |                 |      |  |  |
|                     | e                       | 07 31 51     |         |                           |                 |      |  |  |

| Palisades, New York |                   |             | 13       |  |              | 1961 |  |  |
|---------------------|-------------------|-------------|----------|--|--------------|------|--|--|
| Date                | Phase             | h m s       | Date     | Phase                                  | h m s        |      |  |  |
| Feb. 15             | eLR (SW)          | 04 13 26    | Feb. 18  | Kurile Islands                         |              |      |  |  |
|                     |                   |             | (cont'd) | USCGS 01 04 00.8                       |              |      |  |  |
| 15                  | eLR (SE)          | 07 50 06    |          | 44.0°N 147.5°E                         | Dist. 87.3°  |      |  |  |
|                     |                   |             |          | Depth 28 km                            |              |      |  |  |
| 15                  | eP                | 10 58 02    | 18       | eLQ                                    | 09 03 37     |      |  |  |
|                     | epP               | 10 58 12    |          | eLR                                    | 09 10 07     |      |  |  |
|                     | ePP               | 11 01 38    |          |  |              |      |  |  |
|                     | ePPP              | 11 03 26    | 18       | e (PKKS)                               | 12 38 07     |      |  |  |
|                     | eS                | 11 08 40    |          | e (PKPPKP)                             | 12 43 07     |      |  |  |
|                     | eSKKS             | 11 09 00    |          | eLQ                                    | 12 51 47     |      |  |  |
|                     | ePS               | 11 09 30    |          | eLR                                    | 12 57 07     |      |  |  |
|                     | ePPS              | 11 09 46    |          | Loyalty Islands region                 |              |      |  |  |
|                     | eSS               | 11 15 20    |          | USCGS 12 05 36.3                       |              |      |  |  |
|                     | eLQ               | 11 23 22    |          | 22.6°S 171.3°E                         | Dist. 109.8° |      |  |  |
|                     | eLR (N)           | 11 28 06    |          | Depth 38 km                            |              |      |  |  |
|                     | Kurile Islands    |             | 18       | eP                                     | 17 13 19     |      |  |  |
|                     | USCGS 10 45 15.9  |             |          | eS                                     | 17 22 07     |      |  |  |
|                     | 43.7°N 147.4°E    | Dist. 87.7° |          | ePS                                    | 17 22 37     |      |  |  |
|                     | Depth 69 km       | Mag 6       |          | eSS                                    | 17 26 03     |      |  |  |
|                     | Z 9.5, E 15, N 15 |             |          | eLQ                                    | 17 29 27     |      |  |  |
| 15                  | eLR               | 21 49 06    |          | eLR (SE)                               | 17 32 57     |      |  |  |
|                     |                   |             |          | Atlantic Ocean north of Ascension Isl. |              |      |  |  |
| 16                  | e                 | 03 42 36    |          | USCGS 17 02 10.0                       |              |      |  |  |
|                     | eLQ               | 03 49 06    |          | 1.3°S 15.7°W                           | Dist. 67.0°  |      |  |  |
|                     | eLR               | 03 53 06    |          | Depth 25 km                            | Mag 5        |      |  |  |
| 16                  | eLR               | 04 22 06    |          | Z 4, E 4, N 1.5                        |              |      |  |  |
| 16                  | eLR               | 05 37 06    | 18       | e                                      | 20 32 31     |      |  |  |
|                     |                   |             |          | e                                      | 20 32 52     |      |  |  |
| 16                  | eP                | 14 07 36    | 19       | eLQ                                    | 08 06 07     |      |  |  |
|                     | ePS               | 14 19 26    |          | eLR (NW)                               | 08 15 07     |      |  |  |
|                     | eLR (NW)          | 14 39 06    |          | East of Loyalty Islands                |              |      |  |  |
|                     | Kurile Islands    |             | 19       | eLR (NW)                               | 12 40 55     |      |  |  |
|                     | USCGS 13 54 53.7  |             |          | Kodiak, Alaska                         |              |      |  |  |
|                     | 43.2°N 148.0°E    | Dist. 88.2° | 19       | ePS                                    | 12 56 07     |      |  |  |
|                     | Depth 71 km       |             |          | eLQ                                    | 13 05 27     |      |  |  |
| 17                  | eLR               | 00 57 06    |          | eLR (SE)                               | 13 09 07     |      |  |  |
|                     | Tonga Islands     |             |          | South Atlantic Ocean                   |              |      |  |  |
| 17                  | eLR               | 07 44 06    |          | USCGS 12 33 41.9                       |              |      |  |  |
|                     | Kurile Islands    |             |          | 14.1°S 13.9°W                          | Dist. 77.8°  |      |  |  |
| 18                  | eS                | 01 27 37    |          | Depth 100 km                           |              |      |  |  |
|                     | eSS               | 01 35 27    | 19       | eLR (NW)                               | 13 36 37     |      |  |  |
|                     | eLQ               | 01 44 37    |          | Kodiak, Alaska                         |              |      |  |  |
|                     | eLR (NW)          | 01 49 37    |          |  |              |      |  |  |
|                     | (continued)       |             |          |  |              |      |  |  |

| Palisades, New York |                         |                 | 14      |                     |              | 1961 |  |  |
|---------------------|-------------------------|-----------------|---------|---------------------|--------------|------|--|--|
| Date                | Phase                   | h m s           | Date    | Phase               | h m s        |      |  |  |
| Feb. 20             | eLR (NW)                | 13 25 07        | Feb. 23 | eS                  | 04 40 41     |      |  |  |
|                     |                         |                 |         | eSS                 | 04 47 17     |      |  |  |
| 20                  | eLR (NW)                | 15 17 07        |         | eSSS                | 04 54 07     |      |  |  |
|                     | New Ireland             |                 |         | e(SKKKS)            | 04 57 27     |      |  |  |
|                     |                         |                 |         | eLR (N)             | 05 00 47     |      |  |  |
| 20                  | eLR                     | 16 18 07        |         | Honshu, Japan       |              |      |  |  |
|                     |                         |                 |         | USCGS 04 16 25.     |              |      |  |  |
| 20                  | eP                      | 18 37 07        |         | 38.2°N 142.7°E      | Dist. 94.4°  |      |  |  |
|                     | eS                      | 18 46 23        |         | Depth 119 km        | Mag 5 3/4    |      |  |  |
|                     | e(ScS)                  | 18 47 17        |         | Z 2.5, E 5.5, N 4.5 |              |      |  |  |
|                     | e (PKKP)                | 18 55 51        |         |                     |              |      |  |  |
|                     | eLR (SSE)               | 19 00 37        | 23      | eLR (NE)            | 22 26 06     |      |  |  |
|                     |                         |                 |         | Turkey              |              |      |  |  |
| 20                  | eP                      | 22 35 07        |         |                     |              |      |  |  |
|                     | eS                      | 22 41 39        | 24      | eLR                 | 02 34 06     |      |  |  |
|                     | e                       | 22 43 27        |         | Solomon Islands     |              |      |  |  |
|                     | eSS                     | 22 44 55        |         |                     |              |      |  |  |
|                     | eLQ                     | 22 45 55        | 24      | ePS                 | 03 33 31     |      |  |  |
|                     | eLR (SSW)               | 22 48 07        |         | eSS                 | 03 39 16     |      |  |  |
|                     | Ecuador                 |                 |         | eLQ                 | 03 53 14     |      |  |  |
|                     | USCGS 22 27 00.4        |                 |         | eLR (NE)            | 03 57 32     |      |  |  |
|                     | 2.5°S 77.6°W            | Dist. 43.9°     |         | Ryukyu Islands      |              |      |  |  |
|                     | Depth 50 km             |                 |         | USCGS 03 04 11.7    |              |      |  |  |
| 21                  | eL                      | 16 41 07        |         | 26.1°N 125.4°E      | Dist. 111°   |      |  |  |
|                     |                         |                 |         | Depth 25 km         |              |      |  |  |
| 21                  | eLR                     | 21 39 07        | 24      | eLR                 | 08 48 06     |      |  |  |
|                     |                         |                 |         | Western Bolivia     |              |      |  |  |
| 22                  | eL                      | 03 21 27        | 24      | eLQ                 | 22 34 06     |      |  |  |
|                     | Aleutians               |                 |         | eLR                 | 22 37 06     |      |  |  |
| 22                  | e                       | 08 48 19        | 25      | e                   | 01 49 36     |      |  |  |
|                     |                         |                 |         | e                   | 01 53 14     |      |  |  |
| 22                  | eLR                     | 17 05 07        |         | eLQ                 | 01 54 26     |      |  |  |
|                     |                         |                 |         | eLR                 | 01 56 36     |      |  |  |
| 22                  | ePP                     | 22 13 39        | 25      | eLR                 | 02 18 06     |      |  |  |
|                     | eSKKS                   | 22 20 23        |         | New Hebrides        |              |      |  |  |
|                     | ePS                     | 22 23 27        | 25      | eLR (SW)            | 11 45 16     |      |  |  |
|                     | ePPS                    | 22 24 35        |         |                     |              |      |  |  |
|                     | eSS                     | 22 30 11        | 25      | eSS                 | 15 36 20     |      |  |  |
|                     | eSKKKS                  | 22 34 17        |         | eLQ                 | 15 49 06     |      |  |  |
|                     | eLQ                     | 22 42 37        |         | eLR (NW)            | 15 53 26     |      |  |  |
|                     | eLR (WSW)               | 22 48 37        |         | Samoa               |              |      |  |  |
|                     | Kermadec Islands region |                 |         | USCGS 15 02 04.8    |              |      |  |  |
|                     | USCGS 21 53 34.5        |                 |         | 15.4°S 175.8°W      | Dist. 108.7° |      |  |  |
|                     | 28.4°S 177.2°W          | Dist. 117.2°    |         | Depth 62 km         |              |      |  |  |
|                     | Depth 78 km             | Mag 5 1/2-5 3/4 |         | Z 2.5, E 3.5, N 2.0 |              |      |  |  |
|                     | Z 8, E 6, N 2           |                 | 25      | eLR                 | 17 16 06     |      |  |  |
| 23                  | eLR                     | 04 12 43        |         |                     |              |      |  |  |

| Palisades, New York |                             |                 | 15      |                                   |             | 1961 |  |  |
|---------------------|-----------------------------|-----------------|---------|-----------------------------------|-------------|------|--|--|
| Date                | Phase                       | h m s           | Date    | Phase                             | h m s       |      |  |  |
| Feb. 25             | e                           | 20 53 16        | Feb. 28 | e                                 | 04 03 37    |      |  |  |
|                     | e                           | 20 53 36        |         |                                   |             |      |  |  |
| 26                  | eP                          | 06 01 06        | 28      | e (PS)                            | 08 13 56    |      |  |  |
|                     | eS                          | 06 11 16        |         | e (PPS)                           | 08 15 06    |      |  |  |
|                     | eScS                        | 06 11 34        |         | e (SS)                            | 08 20 36    |      |  |  |
|                     | ePS                         | 06 12 06        |         | eLQ                               | 08 33 26    |      |  |  |
|                     | eSS                         | 06 16 46        |         | eLR                               | 08 40 06    |      |  |  |
|                     | eSSS                        | 06 19 54        | 28      | eLQ                               | 13 23 06    |      |  |  |
|                     | eLQ                         | 06 23 06        |         | eLR                               | 13 28 06    |      |  |  |
|                     | eLR (SW)                    | 06 25 36        |         | Kurile Islands                    |             |      |  |  |
|                     | Easter Island region        |                 |         |                                   |             |      |  |  |
|                     | USCGS 05 48 46.3            |                 | 28      | eS                                | 21 37 38    |      |  |  |
|                     | 32.7°S 111.2°W              | Dist. 81.2°     |         | eLQ                               | 21 44 50    |      |  |  |
|                     | Depth 29 km                 | Mag 5 1/2-5 3/4 |         | eLR                               | 21 50 26    |      |  |  |
|                     | Z 3.5, E 7.0, N 5.0         |                 |         | Salta Prov., Argentina            |             |      |  |  |
| 26                  | eP                          | 18 24 50        |         | USCGS 21 18 11.3                  |             |      |  |  |
|                     | P (Z) 16 sec 4 mic comp NNW |                 |         | 24.1°S 66.6°W                     | Dist. 65°   |      |  |  |
|                     | ePP                         | 18 29 06        |         | Depth 30 km                       |             |      |  |  |
|                     | ePPP                        | 18 31 26        | Mar. 1  | eLR                               | 00 12 06    |      |  |  |
|                     | eSKS                        | 18 35 26        |         |                                   |             |      |  |  |
|                     | eSKKS                       | 18 36 06        | 1       | eLR                               | 08 10 06    |      |  |  |
|                     | eS                          | 18 36 34        |         |                                   |             |      |  |  |
|                     | ePKKP                       | 18 40 26        | 1       | eLR                               | 10 41 06    |      |  |  |
|                     | eSS                         | 18 44 06        |         |                                   |             |      |  |  |
|                     | eSSS                        | 18 49 06        | 1       | eLR                               | 12 42 06    |      |  |  |
|                     | eLQ                         | 18 54 06        |         |                                   |             |      |  |  |
|                     | eLR (NNW)                   | 18 58 46        | 1       | eLR                               | 14 43 06    |      |  |  |
|                     | Near Kyushu, Japan          |                 |         | Near Java                         |             |      |  |  |
|                     | USCGS 18 10 48.7            |                 |         |                                   |             |      |  |  |
|                     | 31.4°N 131.2°E              | Dist. 104.7°    | 1       | eLQ                               | 20 19 06    |      |  |  |
|                     | Depth 54 km                 | Mag 7 1/4       |         | eLR                               | 20 26 06    |      |  |  |
|                     | Z 115, E 125, N 135*        |                 |         | Marianas Islands                  |             |      |  |  |
| 27                  | eLQ                         | 09 28 06        | 1       | ePP                               | 23 54 06    |      |  |  |
|                     | eLR                         | 09 31 06        |         | eS                                | 23 59 32    |      |  |  |
|                     |                             |                 | 2       | eSS                               | 00 03 20    |      |  |  |
| 27                  | eLR                         | 11 09 06        |         | eLQ                               | 00 05 24    |      |  |  |
|                     | Southern Chile              |                 |         | eLR (SW)                          | 00 08 26    |      |  |  |
|                     |                             |                 |         | 1500 km west of Galapagos Islands |             |      |  |  |
| 27                  | eP                          | 18 07 06        |         | USCGS 23 42 43.8                  | Dist. 52.7  |      |  |  |
|                     | eLR                         | 18 56 46        |         | 2.8°S 105.7°W                     | Depth 59 km |      |  |  |
|                     | Tadzik, SSR                 |                 |         | Z 3.5, E 2, N 4                   | Mag 5       |      |  |  |
|                     | USCGS 17 53 35.9            |                 | 2       | eLR                               | 00 27 06    |      |  |  |
|                     | 38.4°N 74.7°E               | Dist. 96.3°     |         | Mexico-Guatemala border           |             |      |  |  |
|                     | Depth 48 km                 |                 |         |                                   |             |      |  |  |
| 27                  | eLR                         | 22 18 06        | 2       | eLR                               | 02 45 06    |      |  |  |
|                     | Aegean Sea                  |                 |         |                                   |             |      |  |  |
|                     |                             |                 | 2       | eLR                               | 05 09 06    |      |  |  |



| Palisades, New York |                               |              |    | 16 |        |                        |               | 1961 |    |  |  |
|---------------------|-------------------------------|--------------|----|----|--------|------------------------|---------------|------|----|--|--|
| Date                | Phase                         | h            | m  | s  | Date   | Phase                  | h             | m    | s  |  |  |
| Mar. 2              | eLR<br>Solomon Islands        | 10           | 08 | 46 | Mar. 5 | ePKP                   | 01            | 45   | 13 |  |  |
|                     |                               |              |    |    |        | epPKP                  | 01            | 45   | 24 |  |  |
| 2                   | eLR                           | 13           | 02 | 36 |        | ePS                    | 01            | 56   | 54 |  |  |
| 2                   | eS                            | 15           | 35 | 39 |        | eSS                    | 02            | 03   | 32 |  |  |
|                     | ePS                           | 15           | 36 | 07 |        | e (PKPPKP)             | 02            | 04   | 24 |  |  |
|                     | eSS                           | 15           | 39 | 51 |        | e (PKPPKS)             | 02            | 08   | 12 |  |  |
|                     | eLQ                           | 15           | 41 | 53 |        | eSSS                   | 02            | 12   | 14 |  |  |
|                     | eLR (SW)                      | 15           | 45 | 25 |        | eLQ                    | 02            | 17   | 44 |  |  |
|                     | Pacific Ocean w. of Galapagos |              |    |    |        | eLR (NW)               | 02            | 23   | 34 |  |  |
|                     | USCGS 15 18 54.3              |              |    |    |        | Solomon Islands region |               |      |    |  |  |
|                     | 4.7°S 106.3°W                 | Dist. 54.4°  |    |    |        | USCGS 01 26 26.1       |               |      |    |  |  |
|                     | Depth 25 km                   | Mag 5        |    |    |        | 10.7°S 161.6°E         | Dist. 122.7°  |      |    |  |  |
|                     | Z 3.5, E 3, N 3.5             |              |    |    |        | Depth 99 km            | Mag 5 3/4 - 6 |      |    |  |  |
|                     |                               |              |    |    |        | Z 6, E 8.5, N 6        |               |      |    |  |  |
| 3                   | eLR                           | 03           | 24 | 45 | 5      | eLR                    | 03            | 20   | 04 |  |  |
| 3                   | eLR<br>New Hebrides           | 04           | 19 | 05 | 5      | e                      | 19            | 21   | 14 |  |  |
| 3                   | eSS                           | 07           | 03 | 15 | 5      | eLR                    | 20            | 55   | 04 |  |  |
|                     | eSSS                          | 07           | 09 | 05 |        | New Guinea             |               |      |    |  |  |
|                     | eLQ                           | 07           | 19 | 25 | 6      | eLR                    | 06            | 35   | 04 |  |  |
|                     | eLR (NW)                      | 07           | 24 | 35 | 6      | eP                     | 12            | 15   | 30 |  |  |
|                     | Loyalty Islands               |              |    |    |        | e                      | 12            | 16   | 01 |  |  |
|                     | USCGS 06 25 37.9              |              |    |    |        | e                      | 12            | 16   | 48 |  |  |
|                     | 22.9°S 171.4°E                | Dist. 123.3° |    |    |        | eS                     | 12            | 16   | 54 |  |  |
|                     | Depth 27 km                   | Mag 5 1/2    |    |    |        | Lg                     | 12            | 17   | 44 |  |  |
|                     | Z 2, E 3, N 2.5               |              |    |    |        | Ontario Prov., Canada  |               |      |    |  |  |
| 3                   | eLR (SW)<br>Kermadec          | 09           | 15 | 05 |        | USCGS 12 13 31         |               |      |    |  |  |
| 3                   | eS                            | 23           | 14 | 21 |        | 48.1°N 80°W            | Dist. 8.23°   |      |    |  |  |
|                     | eSS                           | 23           | 20 | 05 | 7      | eLR                    | 00            | 03   | 04 |  |  |
|                     | eLQ                           | 23           | 25 | 59 | 7      | eLR                    | 05            | 20   | 04 |  |  |
|                     | eLR                           | 23           | 31 | 45 |        | Bonin Islands          |               |      |    |  |  |
|                     | Near coast southern Chile     |              |    |    | 7      | eP                     | 06            | 55   | 44 |  |  |
|                     | USCGS 22 51 15.6              |              |    |    |        | ePP                    | 06            | 59   | 06 |  |  |
|                     | 44.1°S 74.8°W                 | Dist. 84.6°  |    |    |        | e                      | 07            | 05   | 20 |  |  |
|                     | Depth 95 km                   |              |    |    |        | eS                     | 07            | 06   | 12 |  |  |
| 4                   | eLR<br>Central Chile          | 00           | 37 | 05 |        | eSP                    | 07            | 07   | 04 |  |  |
| 4                   | eLQ                           | 21           | 23 | 04 |        | ePPS                   | 07            | 07   | 44 |  |  |
|                     | eLR (SW)                      | 21           | 25 | 04 |        | eSS                    | 07            | 11   | 52 |  |  |
|                     | Near coast of El Salvador     |              |    |    |        | eSSS                   | 07            | 15   | 24 |  |  |
|                     |                               |              |    |    |        | eLQ                    | 07            | 18   | 32 |  |  |
|                     |                               |              |    |    |        | eLR (SSE)              | 07            | 22   | 34 |  |  |
|                     |                               |              |    |    |        | G <sub>2</sub>         | 08            | 37   | 44 |  |  |

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| Palisades, New York |                       |               |    | 17 |          |                     |              | 1961 |    |  |  |
|---------------------|-----------------------|---------------|----|----|----------|---------------------|--------------|------|----|--|--|
| Date                | Phase                 | h             | m  | s  | Date     | Phase               | h            | m    | s  |  |  |
| Mar. 7              | Off coast of Chile    |               |    |    | Mar. 7   | ePPS                | 23           | 44   | 24 |  |  |
| (cont'd)            | USCGS 06 43 10.6      |               |    |    | (cont'd) | eSS                 | 23           | 49   | 58 |  |  |
|                     | 43.3°S 80.4°W         | Dist. 83.8°   |    |    |          | e                   | 23           | 54   | 04 |  |  |
|                     | Depth 60 km           |               |    |    |          | eLQ                 | 00           | 04   | 24 |  |  |
| 7                   | eP                    | 10            | 25 | 36 |          | eLR (NW)            | 00           | 11   | 34 |  |  |
|                     | ePKP                  | 10            | 29 | 20 |          | New Britain region  |              |      |    |  |  |
|                     | ePP                   | 10            | 30 | 24 |          | USCGS 23 11 59.6    |              |      |    |  |  |
|                     | e                     | 10            | 31 | 44 |          | 4.7°S 153.2°E       | Dist. 124.8° |      |    |  |  |
|                     | ePKS                  | 10            | 33 | 04 |          | Depth 90 km         |              |      |    |  |  |
|                     | eSKS                  | 10            | 36 | 12 | 8        | eLR                 | 04           | 35   | 04 |  |  |
|                     | eSKKS                 | 10            | 37 | 28 |          | New Guinea          |              |      |    |  |  |
|                     | e                     | 10            | 38 | 22 | 8        | eLR                 | 06           | 27   | 04 |  |  |
|                     | e                     | 10            | 39 | 30 |          | Kermadec            |              |      |    |  |  |
|                     | ePS                   | 10            | 40 | 12 | 8        | eLR                 | 10           | 04   | 04 |  |  |
|                     | ePKKS                 | 10            | 44 | 08 |          |                     |              |      |    |  |  |
|                     | eSS                   | 10            | 46 | 24 | 8        | eLR                 | 13           | 33   | 04 |  |  |
|                     | e                     | 10            | 49 | 34 |          |                     |              |      |    |  |  |
|                     | eSSS                  | 10            | 51 | 14 | 8        | eLQ                 | 13           | 39   | 04 |  |  |
|                     | eLQ                   | 10            | 57 | 34 |          | eLR                 |              |      |    |  |  |
|                     | eLR (WSW)             | 11            | 05 | 24 |          | Near coast of Chile |              |      |    |  |  |
|                     | Kermadec Islands      |               |    |    | 9        | eP                  | 04           | 06   | 56 |  |  |
|                     | USCGS 10 10 38.9      |               |    |    |          | ePcP                | 04           | 08   | 44 |  |  |
|                     | 28.2°S 175.7°W        | Dist. 115.7°  |    |    |          | eS                  | 04           | 13   | 12 |  |  |
|                     | Depth 43 km           | Mag 7 - 7 1/4 |    |    |          | eLQ                 | 04           | 16   | 24 |  |  |
|                     | Z 95, E 85, N 115*    |               |    |    |          | eLR (SE)            | 04           | 18   | 04 |  |  |
| 7                   | ePKP                  | 19            | 28 | 40 |          | Atlantic Ocean      |              |      |    |  |  |
|                     | ePKP                  | 19            | 29 | 22 |          | USCGS 03 59 08.7    |              |      |    |  |  |
|                     | ePP                   | 19            | 32 | 56 |          | 10.9°N 41.7°W       | Dist. 41.0°  |      |    |  |  |
|                     | eSKS                  | 19            | 36 | 30 |          | Depth 27 km         | Mag 5        |      |    |  |  |
|                     | eSKSP                 | 19            | 43 | 32 |          | Z 3, E 3.5, N 5     |              |      |    |  |  |
|                     | ePPS                  | 19            | 46 | 08 | 9        | eLR                 | 09           | 27   | 04 |  |  |
|                     | eSKSP                 | 19            | 48 | 12 |          |                     |              |      |    |  |  |
|                     | eSS                   | 19            | 53 | 16 | 9        | eLQ                 | 13           | 17   | 34 |  |  |
|                     | eSKSSKS               | 19            | 53 | 56 |          | eLR (SW)            | 13           | 18   | 54 |  |  |
|                     | e                     | 19            | 54 | 44 |          |                     |              |      |    |  |  |
|                     | e                     | 19            | 58 | 24 | 9        | eLQ                 | 14           | 14   | 34 |  |  |
|                     | e                     | 20            | 08 | 20 |          | eLR (SW)            | 14           | 16   | 04 |  |  |
|                     | eLQ                   | 20            | 14 | 24 |          |                     |              |      |    |  |  |
|                     | eLR (SE)              | 20            | 23 | 14 | 9        | e                   | 15           | 00   | 11 |  |  |
|                     | eLR <sub>2</sub> (NW) | 20            | 49 | 24 |          | e                   | 15           | 00   | 41 |  |  |
|                     | Indian Ocean          |               |    |    |          | e                   | 15           | 00   | 44 |  |  |
|                     | USCGS 19 08 36.1      |               |    |    |          | e                   | 15           | 01   | 29 |  |  |
|                     | 38.2°S 78.1°E         | Dist. 158.2°  |    |    |          |                     |              |      |    |  |  |
|                     | Depth 30 km           | Mag 6         |    |    | 9        | e                   | 22           | 04   | 53 |  |  |
|                     | Z 8, E 9, N 5         |               |    |    |          | eLQ                 | 22           | 10   | 03 |  |  |
| 7                   | ePP                   | 23            | 32 | 54 |          | eLR (SW)            | 22           | 14   | 03 |  |  |
|                     | ePKKP                 | 23            | 41 | 04 |          |                     |              |      |    |  |  |

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| Palisades, New York |                          |       |         | 18       |                       |       |              | 1961 |       |   |     |
|---------------------|--------------------------|-------|---------|----------|-----------------------|-------|--------------|------|-------|---|-----|
| Date                | Phase                    | h     | m s     | Date     | Phase                 | h     | m s          | Date | Phase | h | m s |
| Mar. 10             | eSS                      | 03    | 41 51   | Mar. 12  | eLQ                   | 03    | 05 02        |      |       |   |     |
|                     | e                        | 03    | 47 43   | (cont'd) | eLR (WSW)             | 03    | 08 02        |      |       |   |     |
|                     | e                        | 03    | 51 23   |          | Off coast Mexico      |       |              |      |       |   |     |
|                     | eLR                      | 04    | 01 03   |          | USCGS 02 49 33.4      |       |              |      |       |   |     |
|                     | Macquaire Island region  |       |         |          | 17.4°N 107.3°W        | Dist. | 37.2°        |      |       |   |     |
|                     | USCGS 03 00 43.3         |       |         |          | Depth 57 km           |       |              |      |       |   |     |
|                     | 51.9°S 161.6°E           | Dist. | 140.9°  |          | Z 3, E 4, N 6.5       |       |              |      |       |   |     |
|                     | Depth 25 km              |       |         |          |                       |       |              |      |       |   |     |
| 10                  | e                        | 23    | 17 52   | 12       | eLQ                   | 12    | 26 02        |      |       |   |     |
|                     | eS                       | 23    | 24 16   |          | eLR                   | 12    | 32 02        |      |       |   |     |
|                     | eLR (SE)                 | 23    | 28 02   |          | Off coast Mexico      |       |              |      |       |   |     |
|                     | Near coast of Costa Rica |       |         | 12       | eLR                   | 15    | 23 02        |      |       |   |     |
|                     | USCGS 23 12 20.4         |       |         |          | Off coast Oregon      |       |              |      |       |   |     |
|                     | 10.1°N 83.6°W            | Dist. | 32.2°   | 12       | e                     | 18    | 46 51        |      |       |   |     |
|                     | Depth 56 km              |       |         |          | e                     | 18    | 47 14        |      |       |   |     |
| 11                  | eP                       | 01    | 43 42   | 12       | eLR                   | 19    | 39 02        |      |       |   |     |
|                     | e                        | 01    | 53 46   |          |                       |       |              |      |       |   |     |
|                     | eS                       | 01    | 54 14   | 12       | ePP                   | 23    | 41 42        |      |       |   |     |
|                     | ePS                      | 01    | 54 38   |          | ePS                   | 23    | 51 06        |      |       |   |     |
|                     | ePPS                     | 01    | 54 58   |          | eSS                   | 23    | 57 54        |      |       |   |     |
|                     | eSS                      | 01    | 59 18   |          | eSS                   | 00    | 02 22        |      |       |   |     |
|                     | eSSS                     | 02    | 03 52   | 13       | eSKKKS                | 00    | 04 02        |      |       |   |     |
|                     | eLQ                      | 02    | 05 42   |          | eLQ                   | 00    | 10 02        |      |       |   |     |
|                     | eLR (NW)                 | 02    | 10 02   |          | eLR (SW)              | 00    | 16 02        |      |       |   |     |
|                     | Kurile Islands           |       |         |          | Tonga Islands region  |       |              |      |       |   |     |
|                     | USCGS 01 31 34.4         |       |         |          | USCGS 23 21 42.5      |       |              |      |       |   |     |
|                     | 48.7°N 154.6°E           | Dist. | 80.5°   |          | 28.4°S 176.0°W        | Dist. | 116.4°       |      |       |   |     |
|                     | Depth 26 km              | Mag   | 5 3/4-6 |          | Depth 113 km          | Mag   | 5 1/2- 5 3/4 |      |       |   |     |
|                     | Z 5.5, E 13, N 7         |       |         |          | Z 4, E 5.5, N 2.5     |       |              |      |       |   |     |
| 11                  | e (S)                    | 09    | 06 02   | 13       | eLR (NW)              | 05    | 56 02        |      |       |   |     |
|                     | ePPS                     | 09    | 08 26   |          | New Britain           |       |              |      |       |   |     |
|                     | eSS                      | 09    | 13 50   |          |                       |       |              |      |       |   |     |
|                     | e                        | 09    | 17 22   | 13       | eP                    | 08    | 10 40        |      |       |   |     |
|                     | eLQ                      | 09    | 23 02   |          | ePP                   | 08    | 11 52        |      |       |   |     |
|                     | eLR (E)                  | 09    | 28 02   |          | ePPP                  | 08    | 12 12        |      |       |   |     |
|                     | British Somaliland       |       |         |          | e                     | 08    | 15 16        |      |       |   |     |
|                     | USCGS 08 41 00.0         |       |         |          | eS                    | 08    | 16 18        |      |       |   |     |
|                     | 11.2°N 43.3°E            | Dist. | 102.2°  |          | ePcS                  | 08    | 16 54        |      |       |   |     |
|                     | Depth 18 km              |       |         |          | eSS                   | 08    | 18 42        |      |       |   |     |
|                     | Z 3, E 4, N 3            |       |         |          | eLQ                   | 08    | 19 10        |      |       |   |     |
| 11                  | eLQ                      | 19    | 55 02   |          | eLR (WSW)             | 08    | 21 02        |      |       |   |     |
|                     | eLR                      | 19    | 57 32   |          | Off west coast Mexico |       |              |      |       |   |     |
| 11                  | eP                       | 22    | 00 45   |          | USCGS 08 03 43.9      |       |              |      |       |   |     |
|                     | eS                       | 22    | 01 07   |          | 19.2°N 107.3°W        | Dist. | 35.7°        |      |       |   |     |
|                     |                          |       |         |          | Depth 49 km           | Mag   | 6            |      |       |   |     |
| 12                  | eS                       | 03    | 02 30   |          | Z 12, E 25, N 80      |       |              |      |       |   |     |

(continued)

| Palisades, New York |                    |       |        | 19      |                      |       |             | 1961 |       |   |     |
|---------------------|--------------------|-------|--------|---------|----------------------|-------|-------------|------|-------|---|-----|
| Date                | Phase              | h     | m s    | Date    | Phase                | h     | m s         | Date | Phase | h | m s |
| Mar. 13             | e                  | 10    | 57 54  | Mar. 15 | eLQ                  | 23    | 13 02       |      |       |   |     |
|                     |                    |       |        |         | eLR                  | 23    | 16 02       |      |       |   |     |
| 13                  | eLQ                | 19    | 50 02  |         |                      |       |             |      |       |   |     |
|                     | eLR                | 19    | 55 02  | 15      | eLR                  | 23    | 46 02       |      |       |   |     |
|                     | Crete              |       |        |         |                      |       |             |      |       |   |     |
| 13                  | e                  | 20    | 51 02  | 16      | e                    | 05    | 00 02       |      |       |   |     |
|                     | eSKS               | 20    | 59 56  |         | Kermadec             |       |             |      |       |   |     |
|                     | epS                | 21    | 02 28  | 16      | e                    | 05    | 09 07       |      |       |   |     |
|                     | eLR (SE)           | 21    | 24 02  |         | eLQ                  | 05    | 29 42       |      |       |   |     |
|                     | Sandwich Islands   |       |        |         | eLR (NW)             | 05    | 35 02       |      |       |   |     |
|                     | USCGS 20 35 15.4   |       |        | 16      | eLR                  | 07    | 44 02       |      |       |   |     |
|                     | 56.2°S 27.2°W      | Dist. | 104.5° |         | Sunda Strait         |       |             |      |       |   |     |
|                     | Depth 56 km        |       |        | 13      | eLR (NW)             | 22    | 02 02       |      |       |   |     |
|                     |                    |       |        |         | Fiji                 |       |             |      |       |   |     |
| 14                  | eLQ                | 01    | 57 22  | 16      | ePPS                 | 11    | 54 22       |      |       |   |     |
|                     | eLR (NW)           | 02    | 01 32  |         | eSS                  | 12    | 01 02       |      |       |   |     |
|                     | Japan              |       |        |         | eLQ                  | 12    | 19 02       |      |       |   |     |
|                     |                    |       |        |         | eLR                  | 12    | 26 22       |      |       |   |     |
| 14                  | eLR                | 03    | 21 42  |         | Banda Sea            |       |             |      |       |   |     |
|                     |                    |       |        |         | USCGS 11 19 43.5     |       |             |      |       |   |     |
| 14                  | eLQ                | 12    | 26 02  |         | 6.4°S 130.7°E        | Dist. | 138.6°      |      |       |   |     |
|                     | eLR (NW)           | 12    | 31 42  |         | Depth 77 km          |       |             |      |       |   |     |
|                     | Bering Strait      |       |        | 16      | ePKP                 | 14    | 05 05       |      |       |   |     |
|                     | USCGS 11 58 53.9   |       |        |         | iPKP <sub>1</sub>    | 14    | 05 07       |      |       |   |     |
|                     | 67.8°N 164.9°W     | Dist. | 53.1°  |         | ePKP <sub>2</sub>    | 14    | 05 34       |      |       |   |     |
|                     | Depth 78 km        |       |        |         | epPKP                | 14    | 06 34       |      |       |   |     |
| 14                  | eLR                | 20    | 45 32  |         | ePKKP                | 14    | 14 58       |      |       |   |     |
|                     |                    |       |        |         | ePKKS                | 14    | 18 22       |      |       |   |     |
| 15                  | eSKS               | 10    | 41 22  |         | ePPS                 | 14    | 21 02       |      |       |   |     |
|                     | ePKKP              | 10    | 44 02  |         | e (PKPPKP)           | 14    | 22 30       |      |       |   |     |
|                     | ePKKS              | 10    | 47 32  |         | eSS                  | 14    | 27 02       |      |       |   |     |
|                     | eSS                | 10    | 52 34  |         | e                    | 14    | 31 42       |      |       |   |     |
|                     | e                  | 11    | 05 12  |         | eLQ                  | 14    | 45 22       |      |       |   |     |
|                     | eLQ                | 11    | 07 02  |         | eLR (N)              | 14    | 53 32       |      |       |   |     |
|                     | eLR (NW)           | 11    | 14 02  |         | eLR <sub>2</sub> (S) | 15    | 26 42       |      |       |   |     |
|                     | New Ireland region |       |        |         | Flores Island        |       |             |      |       |   |     |
|                     | USCGS 10 14 55.5   |       |        |         | USCGS 13 45 35.6     |       |             |      |       |   |     |
|                     | 3.3°S 150.7°E      | Dist. | 124.7° |         | 8.2°S 122.0°E        | Dist. | 144.2       |      |       |   |     |
|                     | Depth 21 km        | Mag   | 6      |         | Depth 74 km          | Mag   | 6 1/4-6 1/2 |      |       |   |     |
|                     | Z 7.5, E 8.5, N 10 |       |        |         | Z 10, E 13, N 16     |       |             |      |       |   |     |
| 15                  | eLQ                | 13    | 53 32  | 16      | ePKP                 | 18    | 40 46       |      |       |   |     |
|                     | eLR                | 13    | 59 22  |         | eSS                  | 19    | 02 46       |      |       |   |     |
|                     | New Britain        |       |        |         | e                    | 19    | 04 32       |      |       |   |     |
|                     |                    |       |        |         | e                    | 19    | 08 26       |      |       |   |     |
| 15                  | eLR                | 18    | 55 02  |         | e                    | 19    | 14 02       |      |       |   |     |
|                     |                    |       |        |         | eLQ                  | 19    | 21 02       |      |       |   |     |
|                     |                    |       |        |         | eLR (N)              | 19    | 25 32       |      |       |   |     |



| Palisades, New York |                      |              | 20      |                      |              | 1961 |  |  |
|---------------------|----------------------|--------------|---------|----------------------|--------------|------|--|--|
| Date                | Phase                | h m s        | Date    | Phase                | h m s        |      |  |  |
| Mar. 16             | Flores Island        |              | Mar. 17 | eLR (SW)             | 23 21 22     |      |  |  |
| (cont'd)            | USCGS 18 21 12.2     |              |         |                      |              |      |  |  |
|                     | 8.1°S 122.0°E        | Dist. 144.2° |         |                      |              |      |  |  |
|                     | Depth 43 km          |              |         |                      |              |      |  |  |
| 16                  | eLR                  | 21 06 02     | 18      | ePKP                 | 02 28 12     |      |  |  |
|                     | Tonga Islands        |              |         | eSS                  | 02 49 02     |      |  |  |
|                     |                      |              |         | eSKSSKS              | 02 51 02     |      |  |  |
| 16                  | eLR                  | 23 34 02     |         | eLQ                  | 03 08 18     |      |  |  |
|                     | Tonga Islands        |              |         | eLR                  | 03 17 02     |      |  |  |
|                     |                      |              |         | Flores Islands       |              |      |  |  |
|                     |                      |              |         | USCGS 02 08 38.5     |              |      |  |  |
|                     |                      |              |         | 8.2°S 122.0°E        | Dist. 144.8° |      |  |  |
|                     |                      |              |         | Depth 35 km          |              |      |  |  |
| 17                  | e                    | 00 00 02     | 18      | eSS                  | 09 02 42     |      |  |  |
|                     | eLR                  | 00 11 32     |         | eSSS                 | 09 07 22     |      |  |  |
|                     | Tonga Islands        |              |         | eLQ                  | 09 17 02     |      |  |  |
| 17                  | eLR                  | 00 43 02     |         | eLR (SW)             | 09 22 32     |      |  |  |
|                     |                      |              |         | Tonga Islands        |              |      |  |  |
| 17                  | eLR                  | 06 05 02     |         | USCGS 08 26 49.0°    |              |      |  |  |
|                     |                      |              |         | 24.3°S 174.2°W       | Dist. 112.6° |      |  |  |
| 17                  | eLR                  | 13 15 02     |         | Depth 25 km          |              |      |  |  |
|                     |                      |              |         |                      |              |      |  |  |
| 17                  | eSKS                 | 14 31 22     | 18      | ePKP                 | 15 14 44     |      |  |  |
|                     | ePS                  | 14 36 02     |         | eSS                  | 15 36 22     |      |  |  |
|                     | eSS                  | 14 42 38     |         | ePKPPKS              | 15 39 34     |      |  |  |
|                     | eLQ                  | 14 55 02     |         | e                    | 15 41 12     |      |  |  |
|                     | eLR (SW)             | 15 02 02     |         | eSSS                 | 15 44 42     |      |  |  |
|                     | Tonga Islands        |              |         | eSS <sub>2</sub>     | 15 48 02     |      |  |  |
|                     | USCGS 14 06 51.6     |              |         | eLQ                  | 15 52 02     |      |  |  |
|                     | 23.7°S 176.0°W       | Dist. 114.2° |         | eLR (WSW)            | 15 59 22     |      |  |  |
|                     | Depth 49 km          | Mag 5 3/4    |         | South of New Zealand |              |      |  |  |
|                     | Z 5, E 2.5, N 6      |              |         | USCGS 14 54 59.3     |              |      |  |  |
| 17                  | eLR (W)              | 17 15 42     |         | 49.9°S 163.3°E       | Dist. 140°   |      |  |  |
|                     |                      |              |         | Depth 38 km          | Mag 6 1/2    |      |  |  |
| 17                  | eLR                  | 19 12 02     |         | Z 19, E 14, N 18*    |              |      |  |  |
|                     |                      |              |         |                      |              |      |  |  |
| 17                  | ePP                  | 20 30 38     | 18      | eLQ                  | 23 27 02     |      |  |  |
|                     | eSKS                 | 20 36 02     | 19      | eLR (NW)             | 00 03 02     |      |  |  |
|                     | ePS                  | 20 39 48     |         |                      |              |      |  |  |
|                     | eSS                  | 20 46 18     | 19      | iPKP                 | 05 18 48     |      |  |  |
|                     | e                    | 20 50 22     |         | ePPS                 | 05 35 02     |      |  |  |
|                     | e                    | 20 56 12     |         | e                    | 05 36 14     |      |  |  |
|                     | eLQ                  | 20 57 32     |         | eSS                  | 05 42 02     |      |  |  |
|                     | eLR (SW)             | 21 04 34     |         | e                    | 05 47 34     |      |  |  |
|                     | Tonga Islands region |              |         | e                    | 06 01 46     |      |  |  |
|                     | USCGS 20 10 36.4     |              |         | eLQ                  | 06 07 42     |      |  |  |
|                     | 24.3°S 175.6°W       | Dist. 114.2° |         | eLR (NNE)            | 06 13 22     |      |  |  |
|                     | Depth 79 km          | Mag 5 3/4-6  |         | Sunda Strait         |              |      |  |  |
|                     | Z 9, E 11, N 4       |              |         | USCGS 04 59 19.3     |              |      |  |  |
|                     |                      |              |         | 6.4°S 105.5°E        | Dist. 145°   |      |  |  |
| 17                  | eLR                  | 22 19 02     |         | Depth 120 km         |              |      |  |  |

| Palisades, New York |                          |              | 21       |                      |                 | 1961 |  |  |
|---------------------|--------------------------|--------------|----------|----------------------|-----------------|------|--|--|
| Date                | Phase                    | h m s        | Date     | Phase                | h m s           |      |  |  |
| Mar. 19             | eSS                      | 07 52 12     | Mar. 20  | Tonga Islands        |                 |      |  |  |
|                     | eLQ                      | 08 05 02     | (cont'd) | USCGS 15 53 09.9     |                 |      |  |  |
|                     | eLR (NW)                 | 08 11 02     |          | 18.4°S 175.2°W       | Dist. 109.8°    |      |  |  |
|                     | New Hebrides             |              |          | Depth 175 km         | Mag 6.1/4-6 1/2 |      |  |  |
|                     | USCGS 07 14 57.4         |              |          | Z 8, E 12, N 24      |                 |      |  |  |
|                     | 16.0°S 168.2°E           | Dist. 121.4° | Mar. 20  | eP                   | 23 57 51        |      |  |  |
|                     | Depth 90 km              |              | 21       | ePP                  | 00 02 39        |      |  |  |
| 19                  | eLQ                      | 12 57 22     |          | eSKS                 | 00 08 03        |      |  |  |
|                     | eLR (NW)                 | 13 06 22     |          | eSKKKS               | 00 09 59        |      |  |  |
|                     | New Hebrides             |              |          | ePKKP                | 00 11 43        |      |  |  |
|                     |                          |              |          | ePS                  | 00 12 11        |      |  |  |
| 19                  | eSS                      | 21 09 36     |          | ePPS                 | 00 12 57        |      |  |  |
|                     | eLQ                      | 21 25 02     |          | e                    | 00 14 31        |      |  |  |
|                     | eLR (SW)                 | 21 29 02     |          | ePKKS                | 00 15 51        |      |  |  |
|                     | Tonga Islands            |              |          | eSS                  | 00 18 19        |      |  |  |
|                     | USCGS 20 33 55.7         |              |          | eSKKKS               | 00 21 59        |      |  |  |
|                     | 24.1°S 176.1°W           | Dist. 114°   |          | eSSS                 | 00 22 59        |      |  |  |
|                     | Depth 39 km              |              |          | e                    | 00 26 03        |      |  |  |
|                     |                          |              |          | eLQ                  | 00 31 03        |      |  |  |
| 20                  | eP comp fromSW           | 06 22 39     |          | eLR (W)              | 00 36 33        |      |  |  |
|                     | epP                      | 06 22 51     |          | Tonga Islands region |                 |      |  |  |
|                     | ePP                      | 06 24 02     |          | USCGS 23 42 33.9     |                 |      |  |  |
|                     | eS                       | 06 27 14     |          | 24.2°S 175.9°W       | Dist. 114.2°    |      |  |  |
|                     | eS                       | 06 28 10     |          | Depth 25 km          | Mag 6 1/2       |      |  |  |
|                     | eSS                      | 06 30 06     |          | Z 28, E 33, N 11     |                 |      |  |  |
|                     | eLQ                      | 06 31 10     | 21       | eLR                  | 07 05 03        |      |  |  |
|                     | eLR (SW)                 | 06 32 02     |          |                      |                 |      |  |  |
|                     | Off west coast Nicaragua |              | 21       | eLR                  | 07 22 03        |      |  |  |
|                     | USCGS 06 16 23.9         |              |          |                      |                 |      |  |  |
|                     | 11.5°N 86.3°W            | Dist. 30.8°  | 21       | eLR                  | 08 36 03        |      |  |  |
|                     | Depth 122 km             | Mag 5 3/4-6  |          |                      |                 |      |  |  |
|                     | Z 40, E 38, N 57         |              | 21       | eLR                  | 10 36 03        |      |  |  |
|                     |                          |              |          | South of Fiji        |                 |      |  |  |
| 20                  | eP                       | 16 08 13     |          |                      |                 |      |  |  |
|                     | epP                      | 16 08 47     | 21       | eLR                  | 12 15 03        |      |  |  |
|                     | ePP                      | 16 12 25     |          |                      |                 |      |  |  |
|                     | epPP                     | 16 12 47     | 21       | e                    | 17 14 51        |      |  |  |
|                     | eSKS                     | 16 17 49     |          |                      |                 |      |  |  |
|                     | eSKKS                    | 16 18 49     | 21       | eLR (SW)             | 20 53 03        |      |  |  |
|                     | esSKS                    | 16 19 31     |          | Loyalty Islands      |                 |      |  |  |
|                     | e                        | 16 20 53     |          |                      |                 |      |  |  |
|                     | eSP                      | 16 21 15     | 22       | eSS                  | 04 52 23        |      |  |  |
|                     | ePS                      | 16 21 37     |          | eLQ                  | 05 07 03        |      |  |  |
|                     | eSS                      | 16 27 31     |          | eLR (NW)             | 05 12 03        |      |  |  |
|                     | esSS                     | 16 28 47     |          | Solomon Islands      |                 |      |  |  |
|                     | eSSS                     | 16 31 31     |          | USCGS 04 14 03.4     |                 |      |  |  |
|                     | esSSS                    | 16 32 57     |          | 9.0°S 157.9°E        | Dist. 124.2°    |      |  |  |
|                     | e (LQ)                   | 16 39 29     |          | Depth 41 km          |                 |      |  |  |
|                     | eLR (WNW)                | 16 45 03     |          |                      |                 |      |  |  |
|                     | (continued)              |              |          |                      |                 |      |  |  |





| Palisades, New York |                                  |             | 24       |                                   |             | 1961 |  |  |
|---------------------|----------------------------------|-------------|----------|-----------------------------------|-------------|------|--|--|
| Date                | Phase                            | h m s       | Date     | Phase                             | h m s       |      |  |  |
| Mar. 30             | eLQ                              | 13 01 02    | Apr. 4   | e (LQ)                            | 10 26 01    |      |  |  |
|                     | eLR                              | 13 05 02    | (cont'd) | eLR (NNE)                         | 10 31 31    |      |  |  |
|                     |                                  |             |          | Sinkiang Province, China          |             |      |  |  |
| 31                  | eLQ                              | 21 52 22    |          | USCGS 09 46 36.6                  |             |      |  |  |
|                     | eLR                              | 21 56 02    |          | 40.1°N 77.8°E                     | Dist. 95.4° |      |  |  |
|                     |                                  |             |          | Depth 16 km                       | Mag 6       |      |  |  |
| Apr. 1              | ePP                              | 15 35 40    |          | Z 13.5, E 8, N 12*                |             |      |  |  |
|                     | ePPP                             | 15 37 38    |          |                                   |             |      |  |  |
|                     | eSKS                             | 15 42 24    | 4        | eLR                               | 20 21 01    |      |  |  |
|                     | ePS                              | 15 44 20    |          |                                   |             |      |  |  |
|                     | ePPS                             | 15 44 36    | 4        | eLR                               | 21 50 01    |      |  |  |
|                     | eSS                              | 15 49 44    |          |                                   |             |      |  |  |
|                     | eSSS                             | 15 53 34    | 5        | eLR (NW)                          | 05 27 01    |      |  |  |
|                     | eLQ                              | 15 57 32    |          |                                   |             |      |  |  |
|                     | eLR (NNE)                        | 16 03 02    | 5        | eP                                | 07 00 01    |      |  |  |
|                     | Sinkiang Province, China         |             |          | eLR                               | 07 38 01    |      |  |  |
|                     | USCGS 15 18 22.8                 |             |          | Sinkiang, China                   |             |      |  |  |
|                     | 39.6°N 77.7°E                    | Dist. 95.4° |          |                                   |             |      |  |  |
|                     | Depth 21 km                      | Mag 6       | 5        | eL                                | 09 25 01    |      |  |  |
|                     | Z 15, E 8, N 18*                 |             |          |                                   |             |      |  |  |
| 2                   | eLR                              | 01 15 02    |          |                                   |             |      |  |  |
| 2                   | eLR                              | 09 11 22    | 5        | e                                 | 20 40 32    |      |  |  |
|                     |                                  |             |          | e                                 | 20 40 54    |      |  |  |
| 2                   | eLR                              | 09 21 22    | 5        | eLR                               | 22 43 01    |      |  |  |
|                     |                                  |             |          | Macquarie Island region           |             |      |  |  |
| 2                   | eLQ                              | 15 20 22    |          |                                   |             |      |  |  |
|                     | eLR (W)                          | 15 24 22    | 6        | eLQ                               | 02 16 01    |      |  |  |
|                     | 700 km NW of Easter Island       |             |          | eLR (NE)                          | 02 19 31    |      |  |  |
|                     |                                  |             |          | Sinkiang, China                   |             |      |  |  |
| 2                   | eLQ                              | 21 38 12    | 6        | eP                                | 04 12 03    |      |  |  |
|                     | eLR                              | 21 45 22    |          | eS                                | 04 17 57    |      |  |  |
|                     |                                  |             |          | ePcS                              | 04 18 21    |      |  |  |
| 2                   | eLR                              | 23 32 02    |          | eSS                               | 04 20 35    |      |  |  |
|                     |                                  |             |          | eLQ                               | 04 21 31    |      |  |  |
| 3                   | eS                               | 08 05 42    |          | eLR (WNW)                         | 04 24 01    |      |  |  |
|                     | eLQ                              | 08 07 02    |          | Near coast of Northern California |             |      |  |  |
|                     | eLR (SW)                         | 08 08 12    |          | USCGS 04 04 46.1                  |             |      |  |  |
|                     | North of Swan Island, Carib. Sea |             |          | 40.1°N 124.8°W                    | Dist. 38.4° |      |  |  |
|                     | USCGS 07 55 52.1                 |             |          | Depth 73 km                       |             |      |  |  |
|                     | 17.5°N 84.1°W                    | Dist. 24.5° |          |                                   |             |      |  |  |
|                     | Depth 92 km                      |             | 6        | eLQ                               | 12 54 01    |      |  |  |
| 4                   | eLR                              | 02 03 31    |          | eLR                               | 12 57 01    |      |  |  |
|                     | China                            |             |          |                                   |             |      |  |  |
| 4                   | eSKS                             | 10 10 41    | 6        | eLQ                               | 15 08 22    |      |  |  |
|                     | ePS                              | 10 12 47    |          | eLR (NE)                          | 15 14 02    |      |  |  |
|                     | ePPS                             | 10 13 13    |          | Near coast of Sumatra             |             |      |  |  |
|                     | eSS                              | 10 18 17    |          |                                   |             |      |  |  |
|                     | eSSS                             | 10 22 05    | 6        | eLQ                               | 18 55 02    |      |  |  |
|                     | (continued)                      |             |          | eLR (NE)                          | 19 00 02    |      |  |  |
|                     |                                  |             |          | Southern Iran                     |             |      |  |  |

| Palisades, New York |                        |             | 25     |                            |                 | 1961 |  |  |
|---------------------|------------------------|-------------|--------|----------------------------|-----------------|------|--|--|
| Date                | Phase                  | h m s       | Date   | Phase                      | h m s           |      |  |  |
| Apr. 6              | eLQ                    | 23 29 32    | Apr. 8 | eSKKKS                     | 16 38 52        |      |  |  |
|                     | eLR                    | 23 36 02    |        | eSSS                       | 16 47 32        |      |  |  |
|                     | Sumatra                |             |        | eLQ                        | 16 52 02        |      |  |  |
|                     |                        |             |        | eLR (WNW)                  | 16 58 02        |      |  |  |
| 7                   | eLR                    | 07 35 02    |        | New Hebrides               |                 |      |  |  |
|                     |                        |             |        | USCGS 15 59 49.2           |                 |      |  |  |
| 7                   | eS                     | 20 15 22    |        | 18.2°S 168.6°E             | Dist. 121.9°    |      |  |  |
|                     | eSS                    | 20 20 02    |        | Depth 120 km               |                 |      |  |  |
|                     | eLQ                    | 20 25 32    |        |                            |                 |      |  |  |
|                     | eLR (NW)               | 20 28 32    | 8      | eP Comp from S             | 18 11 46        |      |  |  |
|                     | Kamchatka              |             |        | ePP                        | 18 14 34        |      |  |  |
|                     | USCGS 19 54 51.9       |             |        | ePPP                       | 18 17 02        |      |  |  |
|                     | 57.2°N 163.3°E         | Dist. 71.2° |        | eS                         | 18 21 46        |      |  |  |
|                     | Depth 20 km            |             |        | ePS                        | 18 22 32        |      |  |  |
|                     |                        |             |        | eSS                        | 18 26 30        |      |  |  |
| 7                   | e                      | 20 16 52    |        | eSSS                       | 18 30 22        |      |  |  |
|                     | e                      | 20 17 18    |        | eLQ                        | 18 33 22        |      |  |  |
|                     |                        |             |        | eLR (SSE)                  | 18 36 22        |      |  |  |
| 7                   | eLQ                    | 22 06 32    |        | Chile                      |                 |      |  |  |
|                     | eLR (NE)               | 22 08 02    |        | USCGS 17 59 46.7           |                 |      |  |  |
|                     | Kirghin-Tadzhik border |             |        | 38.2°S 72.7°W              | Dist. 78.6°     |      |  |  |
|                     |                        |             |        | Depth 60 km                | Mag 5 3/4-6     |      |  |  |
| 8                   | eLQ                    | 00 47 42    |        |                            |                 |      |  |  |
|                     | eLR (NE)               | 00 50 32    |        |                            |                 |      |  |  |
| 8                   | eLQ                    | 03 22 02    | 8      | ePS                        | 22 05 31        |      |  |  |
|                     | eLR                    | 03 25 32    |        | eSS                        | 22 11 47        |      |  |  |
|                     | Near coast of Ecuador  |             |        | eSSS                       | 22 19 03        |      |  |  |
|                     |                        |             |        | eLQ                        | 22 22 43        |      |  |  |
|                     |                        |             |        | eLR (NW)                   | 22 29 03        |      |  |  |
| 8                   | eS                     | 04 36 42    |        | Marianas Islands           |                 |      |  |  |
|                     | eLR (SE)               | 04 43 32    |        | USCGS 21 36 41.6           |                 |      |  |  |
|                     | Ecuador                |             |        | 14.8°N 145.1°E             | Dist. 113.6°    |      |  |  |
|                     | USCGS 04 22 08.7       |             |        | Depth 105 km               |                 |      |  |  |
|                     | 2.2°S 79.2°W           | Dist. 43.0° |        |                            |                 |      |  |  |
|                     | Depth 25 km            |             | 9      | e (P)                      | 07 30 55        |      |  |  |
|                     |                        |             |        | eS                         | 07 36 11        |      |  |  |
| 8                   | eLQ                    | 05 01 32    |        | ePcS                       | 07 36 23        |      |  |  |
|                     | eLR (SE)               | 05 08 02    |        | eLQ                        | 07 38 33        |      |  |  |
|                     | Ecuador                |             |        | eLR (WNW)                  | 07 41 03        |      |  |  |
|                     |                        |             |        | Lg                         | 07 43 03        |      |  |  |
| 8                   | eP                     | 09 11 50    |        | Rg                         | 07 46 03        |      |  |  |
|                     | ePPP                   | 09 14 02    |        | San Benito Co., California |                 |      |  |  |
|                     | eS                     | 09 18 10    |        | USCGS 07 23 16.0           |                 |      |  |  |
|                     | eLQ                    | 09 21 02    |        | 36.5°N 121.3°W             | Dist. 36.5°     |      |  |  |
|                     | eLR (SE)               | 09 25 02    |        | Depth 11 km                | Mag 5 1/2-5 3/4 |      |  |  |
|                     | Ecuador                |             |        | Z 25, E -, N 21            |                 |      |  |  |
|                     | USCGS 09 03 48.9       |             |        |                            |                 |      |  |  |
|                     | 2.1°S 79.1°W           | Dist. 43.1° | 9      | eP                         | 09 33 33        |      |  |  |
|                     | Depth 24 km            |             |        | ePP (NW)                   | 09 41 03        |      |  |  |
|                     |                        |             |        | Fiji                       |                 |      |  |  |
| 8                   | ePS                    | 16 32 32    |        | USCGS 09 21 29.0           |                 |      |  |  |
|                     | (continued)            |             |        | (continued)                |                 |      |  |  |

| Palisades, New York |                           |              | 26      |                                 |                 | 1961 |  |  |
|---------------------|---------------------------|--------------|---------|---------------------------------|-----------------|------|--|--|
| Date                | Phase                     | h m s        | Date    | Phase                           | h m s           |      |  |  |
| Apr. 9              | 26.0°S 178.4°E            |              | Apr. 12 | eLQ                             | 12 42 23        |      |  |  |
| (cont'd)            | Depth 655 km              |              |         | eLR                             | 12 49 03        |      |  |  |
| 9                   | ePP                       | 15 54 39     | 12      | eLR                             | 15 45 03        |      |  |  |
|                     | ePKS                      | 15 56 57     |         | Kurile Islands                  |                 |      |  |  |
|                     | eSKS                      | 16 00 27     |         |                                 |                 |      |  |  |
|                     | eSKKS                     | 16 01 41     | 12      | eLR                             | 18 10 03        |      |  |  |
|                     | ePS                       | 16 04 11     |         | Northern Celebes                |                 |      |  |  |
|                     | ePPS                      | 16 05 19     |         |                                 |                 |      |  |  |
|                     | eSS                       | 16 10 35     | 12      | eLR                             | 18 49 03        |      |  |  |
|                     | eLQ                       | 16 23 43     |         | Kurile Islands                  |                 |      |  |  |
|                     | eLR (N)                   | 16 29 33     |         |                                 |                 |      |  |  |
|                     | Near coast of Formosa     |              | 12      | iP                              | 22 26 41        |      |  |  |
|                     | USCGS 15 35 05.4          |              |         | P (Z) 7 sec 2 mic comp from SSW |                 |      |  |  |
|                     | 24.1°N 122.2°E            | Dist. 113.6° |         | epP                             | 22 27 01        |      |  |  |
|                     | Depth 13 km               | Mag 6-6 1/4  |         | ePP                             | 22 27 29        |      |  |  |
|                     | Z 12, E 8, N 9*           |              |         | epPP                            | 22 27 55        |      |  |  |
|                     |                           |              |         | eS                              | 22 31 35        |      |  |  |
|                     |                           |              |         | esS                             | 22 31 59        |      |  |  |
| 9                   | eP                        | 17 27 50     |         | ePcS                            | 22 33 11        |      |  |  |
|                     | Chile-Peru border         |              |         | eLQ                             | 22 33 55        |      |  |  |
|                     | USCGS 17 17 47.6          |              |         | eLR (SSW)                       | 22 35 03        |      |  |  |
|                     | 18.2°S 70.2°W             | Dist. 58.8°  |         | El Salvador                     |                 |      |  |  |
|                     | Depth 29 km               |              |         | USCGS 22 20 33.6                |                 |      |  |  |
|                     |                           |              |         | 13.1°N 88.9°W                   | Dist. 30.8°     |      |  |  |
| 10                  | e                         | 07 54 33     |         | Depth 122 km                    | Mag 5 1/4-5 1/2 |      |  |  |
|                     | eLQ                       | 07 57 33     |         | Z 13, E 25, N 19                |                 |      |  |  |
|                     | eLR                       | 08 02 03     |         |                                 |                 |      |  |  |
| 10                  | eLR                       | 13 21 43     | 13      | eLR                             | 06 05 03        |      |  |  |
| 10                  | eLR                       | 17 40 03     | 13      | ePP                             | 16 51 53        |      |  |  |
|                     | Honshu, Japan             |              |         | eSKS                            | 16 58 47        |      |  |  |
|                     |                           |              |         | ePS                             | 17 00 49        |      |  |  |
| 10                  | eSS                       | 20 20 19     |         | eSS                             | 17 06 19        |      |  |  |
|                     | e                         | 20 30 53     |         | e (PcPPKP)                      | 17 09 43        |      |  |  |
|                     | eLQ                       | 20 39 43     |         | eSSS                            | 17 13 23        |      |  |  |
|                     | eLR (NW)                  | 20 43 33     |         | eLQ                             | 17 15 03        |      |  |  |
|                     | Near coast of New Guinea  |              |         | eLR (NNE)                       | 17 19 15        |      |  |  |
|                     | USCGS 19 40 15.9          |              |         | Sinkiang, China                 |                 |      |  |  |
|                     | 0.2°S 132.9°E             | Dist. 133.3  |         | UCSGS 16 34 39.1                |                 |      |  |  |
|                     | Depth 36 km               |              |         | 40.1°N 77.8°E                   | Dist. 95.4°     |      |  |  |
|                     |                           |              |         | Depth 19 km                     | Mag 6 1/2       |      |  |  |
| 11                  | eLR                       | 11 59 03     |         | Z 30, E 42, N 43                |                 |      |  |  |
| 11                  | eLR                       | 12 35 33     | 14      | eLR                             | 04 42 23        |      |  |  |
| 11                  | eLQ                       | 18 44 03     | 14      | eLR                             | 13 45 03        |      |  |  |
|                     | eLR                       | 18 46 03     |         | Marianas Islands                |                 |      |  |  |
|                     | Sumbawa Islands           |              |         |                                 |                 |      |  |  |
| 11                  | eLQ                       | 20 52 03     | 14      | eLR                             | 17 32 33        |      |  |  |
|                     | eLR (NW)                  | 20 56 03     |         |                                 |                 |      |  |  |
|                     | North of Vancouver Island |              |         |                                 |                 |      |  |  |

| Palisades, New York |                                    |             | 27      |                        |             | 1961 |  |  |
|---------------------|------------------------------------|-------------|---------|------------------------|-------------|------|--|--|
| Date                | Phase                              | h m s       | Date    | Phase                  | h m s       |      |  |  |
| Apr. 15             | eLQ                                | 01 13 33    | Apr. 17 | eLQ                    | 00 14 03    |      |  |  |
|                     | eLR                                | 01 18 03    |         | eLR                    | 00 20 03    |      |  |  |
|                     | Honshu, Japan                      |             |         | South coast New Guinea |             |      |  |  |
| 15                  | eLQ                                | 02 18 03    | 17      | e                      | 02 53 29    |      |  |  |
|                     | eLR                                | 02 21 03    |         | eLQ                    | 03 10 23    |      |  |  |
|                     |                                    |             |         | eLR                    | 03 15 03    |      |  |  |
| 15                  | eLR                                | 07 23 03    | 17      | eLR                    | 04 31 33    |      |  |  |
| 15                  | eLQ                                | 10 31 03    | 17      | eLR                    | 07 54 33    |      |  |  |
|                     | eLR                                | 10 35 33    |         |                        |             |      |  |  |
|                     | Kermadec Islands                   |             |         |                        |             |      |  |  |
| 15                  | eL                                 | 12 46 03    | 17      | eLQ                    | 13 54 03    |      |  |  |
|                     |                                    |             |         | eLR                    | 14 01 03    |      |  |  |
| 15                  | eLR                                | 18 50 03    | 17      | i                      | 14 29 14    |      |  |  |
| 16                  | eLR                                | 01 02 33    | 17      | i                      | 16 14 36    |      |  |  |
| 16                  | eLQ                                | 05 17 03    | 17      | eLQ                    | 16 43 23    |      |  |  |
|                     | eLR                                | 05 19 03    |         | eLR (SE)               | 16 46 17    |      |  |  |
|                     | Central Utah                       |             |         | Mid Atlantic           |             |      |  |  |
|                     | USCGS 05 02 39.3                   |             |         | USCGS 16 21 10.2       |             |      |  |  |
|                     | 39.1°N 111.5°W                     | Dist. 29.1° |         | 3.9°N 31.5°W           |             |      |  |  |
|                     | Depth 35km                         |             |         |                        |             |      |  |  |
| 16                  | eLR                                | 09 08 03    | 17      | eP                     | 20 46 03    |      |  |  |
|                     |                                    |             |         | eS                     | 20 53 33    |      |  |  |
|                     |                                    |             |         | eLQ                    | 21 00 37    |      |  |  |
| 16                  | eP                                 | 11 52 24    |         | eLR (S)                | 21 04 23    |      |  |  |
|                     | eLR                                | 12 08 03    |         | Chile-Bolivia border   |             |      |  |  |
|                     | Kamchatka                          |             |         | USCGS 20 35 15.4       |             |      |  |  |
|                     | USCGS 11 40 40.7                   |             |         | 20.8°S 68.5°W          | Dist. 61.8° |      |  |  |
|                     | 53.5°N 158.7°E                     | Dist. 75.0° |         | Depth 200 km           |             |      |  |  |
|                     | Depth 27 km                        |             |         |                        |             |      |  |  |
| 16                  | eSS                                | 12 39 11    | 18      | eLQ                    | 05 08 33    |      |  |  |
|                     | eLQ                                | 12 41 03    |         | eLR                    | 05 11 43    |      |  |  |
|                     | eLR (WNW)                          | 12 43 23    | 18      | eLQ                    | 05 47 03    |      |  |  |
|                     | Off northwest coast Vancouver Isl. |             |         | eLR                    | 05 53 03    |      |  |  |
|                     | 51.6°N 130.6°W                     | Dist. 39.8° |         |                        |             |      |  |  |
|                     | Depth 50 km                        |             |         |                        |             |      |  |  |
|                     | USCGS 12 22 47.1                   |             | 18      | eLR                    | 09 21 03    |      |  |  |
|                     |                                    |             |         | Kurile Islands         |             |      |  |  |
| 16                  | eLQ                                | 12 58 03    | 18      | eLR                    | 13 20 03    |      |  |  |
|                     | eLR (NW)                           | 13 05 33    |         |                        |             |      |  |  |
| 16                  | eLQ                                | 17 46 03    | 18      | eLR                    | 14 52 03    |      |  |  |
|                     | eLR                                | 17 50 03    |         | Banda Sea              |             |      |  |  |
| 16                  | eLQ                                | 22 40 03    | 18      | e                      | 19 11 35    |      |  |  |
|                     | eLR                                | 22 46 03    |         | e                      | 19 20 03    |      |  |  |
|                     |                                    |             |         | eLQ                    | 19 25 03    |      |  |  |
|                     |                                    |             |         | eLR (SE)               | 19 31 03    |      |  |  |



| Palisades, New York |                   |                 | 28      |                        |              | 1961 |  |  |
|---------------------|-------------------|-----------------|---------|------------------------|--------------|------|--|--|
| Date                | Phase             | h m s           | Date    | Phase                  | h m s        |      |  |  |
| Apr. 19             | eL                | 07 47 03        | Apr. 20 | eL                     | 01 11 03     |      |  |  |
| 19                  | eSS               | 08 17 17        | 20      | eL                     | 01 48 03     |      |  |  |
|                     | eLQ               | 08 36 03        |         |                        |              |      |  |  |
|                     | eLR               | 08 41 03        | 20      | eL                     | 03 12 03     |      |  |  |
|                     | New Hebrides      |                 |         |                        |              |      |  |  |
|                     | USCGS 07 39 12.8  |                 | 20      | e                      | 04 01 54     |      |  |  |
|                     | 18.2°S 168.2°E    | Dist. 122.6°    |         | e                      | 04 01 59     |      |  |  |
|                     | Depth 98 km       |                 |         | e                      | 04 02 33     |      |  |  |
| 19                  | eL                | 09 43 03        | 20      | eLQ                    | 06 26 03     |      |  |  |
|                     |                   |                 |         | eLR                    | 06 32 03     |      |  |  |
| 19                  | i                 | 15 09 59        |         | Kurile Islands         |              |      |  |  |
| 19                  | eP                | 16 25 43        | 20      | eL                     | 12 07 03     |      |  |  |
|                     | eS                | 16 35 43        |         |                        |              |      |  |  |
|                     | eSS               | 16 42 43        | 20      | eLQ                    | 13 55 23     |      |  |  |
|                     | eLQ               | 16 50 43        |         | eLR                    | 14 01 03     |      |  |  |
|                     | eLR (NNW)         | 16 54 23        |         | Aleutian Islands       |              |      |  |  |
|                     | Kurile Islands    |                 |         |                        |              |      |  |  |
|                     | USCGS 16 12 28.7  |                 | 20      | e                      | 17 20 48     |      |  |  |
|                     | 44.2°N 148.0°E    | Dist. 87.4°     |         | e                      | 17 20 50     |      |  |  |
|                     | Depth 51 km       | Mag 5 1/4       |         |                        |              |      |  |  |
|                     | Z 1.5, E 2, N 2.5 |                 | 20      | eLR (SW)               | 20 19 03     |      |  |  |
|                     |                   |                 |         | Kermadec               |              |      |  |  |
| 19                  | i                 | 17 18 38        | 20      | i                      | 21 08 04     |      |  |  |
| 19                  | e                 | 17 51 38        |         |                        |              |      |  |  |
|                     |                   |                 | 20      | eSKS                   | 22 04 09     |      |  |  |
| 19                  | e (P)             | 18 25 17        |         | ePS                    | 22 07 09     |      |  |  |
|                     | e                 | 18 43 03        |         | ePPS                   | 22 08 21     |      |  |  |
|                     | eLQ               | 18 45 23        |         | eSS                    | 22 13 11     |      |  |  |
|                     | eLR (NW)          | 18 49 53        |         | eLQ                    | 22 25 23     |      |  |  |
|                     |                   |                 |         | eLR (NW)               | 22 29 23     |      |  |  |
| 19                  | eS                | 20 43 03        |         | South of Samoa Islands |              |      |  |  |
|                     | eSS               | 20 48 47        |         | USCGS 21 39 07.0       |              |      |  |  |
|                     | eLQ               | 20 58 03        |         | 15.2°S 173.7°W         | Dist. 107.2° |      |  |  |
|                     | eLR (NNW)         | 21 02 23        |         | Depth 25 km            | Mag 5 3/4-6  |      |  |  |
|                     | Kurile Islands    |                 |         | Z 4.5, E 8, N 3        |              |      |  |  |
|                     | USCGS 20 19 46.4  |                 | 20      | eLR (E)                | 23 47 03     |      |  |  |
|                     | 44.6°N 150.2°E    | Dist. 85.7      |         |                        |              |      |  |  |
|                     | Depth 27 km       | Mag 5 1/4-5 1/2 |         |                        |              |      |  |  |
|                     | Z 2.5, E 3, N 4   |                 | 21      | eLQ                    | 07 46 03     |      |  |  |
|                     |                   |                 |         | eLR                    | 07 55 03     |      |  |  |
| 19                  | eSKS              | 22 31 03        | 21      | eLR                    | 14 51 03     |      |  |  |
|                     | eLR (NW)          | 22 51 33        |         |                        |              |      |  |  |
|                     | Kurile Islands    |                 |         |                        |              |      |  |  |
|                     | USCGS 22 07 51.2  |                 | 21      | e                      | 18 56 26     |      |  |  |
|                     | 44.9°N 149.5°E    | Dist. 85.7°     |         |                        |              |      |  |  |
|                     | Depth 34 km       |                 |         |                        |              |      |  |  |

| Palisades, New York |                  |                 | 29      |                       |              |
|---------------------|------------------|-----------------|---------|-----------------------|--------------|
| Date                | Phase            | h m s           | Date    | Phase                 | h m s        |
| Apr. 21             | ePPP             | 19 47 33        | Apr. 22 | eLR (S)               | 19 26 23     |
|                     | e                | 20 03 33        |         | Near coast of Ecuador |              |
|                     | eLR              | 20 10 23        |         | USCGS 19 01 34.4      |              |
|                     | Kurile Islands   |                 |         | 2.8°S 80.8°W          | Dist. 44.3°  |
|                     | USCGS 19 30 36.9 |                 |         | Depth 30 km           |              |
|                     | 48.1°N 154.6°E   | Dist. 81.4°     |         |                       |              |
|                     | Depth 23km       |                 | 22      | eLQ                   | 19 51 03     |
| 21                  | e                | 20 37 03        |         | eLR (NW)              | 19 58 33     |
|                     |                  |                 |         | New Britain region    |              |
| 21                  | eSS              | 20 39 19        |         |                       |              |
|                     | eSSS             | 20 43 03        | 22      | e                     | 20 28 37     |
|                     | eLQ              | 20 46 33        |         | e                     | 20 28 57     |
|                     | eLR (NW)         | 20 51 03        |         |                       |              |
|                     | Kurile Islands   |                 | 23      | eLR                   | 03 32 03     |
|                     | USCGS 20 10 38.3 |                 |         |                       |              |
|                     | 47.7°N 154.6°E   | Dist. 81.4°     | 23      | eSKS                  | 05 40 11     |
|                     | Depth 27 km      |                 |         | ePPS                  | 05 44 57     |
|                     | Z 3, E 4, N 3.5  |                 |         | eSS                   | 05 49 03     |
|                     |                  |                 |         | eLQ                   | 05 59 43     |
| 21                  | e                | 21 16 51        |         | eLR                   | 06 07 43     |
|                     |                  |                 |         | Ruykyu Islands        |              |
| 21                  | eP               | 21 37 19        |         | USCGS 05 14 31.1      |              |
|                     | epP              | 21 37 33        |         | 26.2°N 129.8°E        | Dist. 109.7° |
|                     | eS               | 21 45 57        |         | Depth 110 km          |              |
|                     | ePS              | 21 46 09        |         |                       |              |
|                     | eScS             | 21 46 59        | 23      | eP                    | 09 14 21     |
|                     | eSS              | 21 50 23        |         | 8 sec 2.5 mic NNW     |              |
|                     | eLQ              | 21 55 33        |         | ePP                   | 09 17 39     |
|                     | eLR (NW)         | 22 00 33        |         | eS                    | 09 24 47     |
|                     | Aleutian Islands |                 |         | ePPS                  | 09 25 43     |
|                     | USCGS 21 26 42.1 |                 |         | eSS                   | 09 30 41     |
|                     | 51.7°N 173.9°W   | Dist. 64.4°     |         | ePKKS                 | 09 34 55     |
|                     | Depth 36 km      | Mag 5 1/4-5 1/2 |         | eSSS                  | 09 37 17     |
|                     | Z 3, E 4, N 5    |                 |         | eLQ                   | 09 39 03     |
|                     |                  |                 |         | eLR                   | 09 44 13     |
| 22                  | e                | 01 08 33        |         | Kurile Islands        |              |
|                     | e                | 01 11 03        |         | USCGS 09 01 41.8      |              |
|                     | e                | 01 13 23        |         | 44.6°N 150.2°E        | Dist. 85.7°  |
|                     | e                | 01 16 43        |         | Depth 44 km           | Mag 6 1/2    |
|                     | eLQ              | 01 22 15        |         | Z 42, E 39, N 57.5    |              |
|                     | eLR (NW)         | 01 29 03        |         |                       |              |
| 22                  | eLR (SE)         | 02 20 33        | 23      | eLQ                   | 15 40 03     |
|                     |                  |                 |         | eLR                   | 15 46 33     |
| 22                  | e                | 17 01 51        | 23      | eS                    | 17 14 07     |
|                     | e                | 17 01 56        |         | eSS                   | 17 19 53     |
|                     | e                | 17 02 31        |         | eLQ                   | 17 29 15     |
|                     |                  |                 |         | eLR (NW)              | 17 35 03     |
| 22                  | e (P)            | 19 10 10        |         | Kurile Islands        |              |
|                     | eS               | 19 16 31        |         | USCGS 16 51 03.6      |              |
|                     | eSS              | 19 19 37        |         | 44.5°N 150.1°E        | Dist. 85.7°  |
|                     | (continued)      |                 |         | (continued)           |              |

| Palisades, New York |                   |    | 30 |    |          | 1961             |    |    |    |
|---------------------|-------------------|----|----|----|----------|------------------|----|----|----|
| Date                | Phase             | h  | m  | s  | Date     | Phase            | h  | m  | s  |
| Apr. 22             | Depth 76 km       |    |    |    | Apr. 25  | 32.7°S 178.5°W   |    |    |    |
| (cont'd)            | Z 1.5, E 2, N 3   |    |    |    | (cont'd) | Depth 45km       |    |    |    |
|                     |                   |    |    |    |          | Z 3, 5, E 4, N 2 |    |    |    |
| 23                  | eLR               | 21 | 35 | 43 | 25       | e                | 16 | 23 | 46 |
|                     | Aleutian Islands  |    |    |    |          |                  |    |    |    |
| 24                  | eLQ               | 05 | 22 | 33 | 25       | i                | 17 | 01 | 45 |
|                     | eLR               | 05 | 29 | 03 |          |                  |    |    |    |
| 24                  | eS                | 12 | 50 | 51 | 25       | e                | 17 | 07 | 07 |
|                     | eSS               | 12 | 56 | 23 | 25       | i                | 18 | 37 | 35 |
|                     | eLQ               | 13 | 11 | 43 | 25       | i                | 19 | 54 | 47 |
|                     | eLR (NW)          | 13 | 17 | 43 | 25       | i                | 20 | 37 | 45 |
|                     | Kurile Islands    |    |    |    | 26       | eLQ              | 07 | 15 | 03 |
|                     | USCGS 12 27 39.5  |    |    |    |          | eLR              | 07 | 22 | 33 |
|                     | 44.5°N 150.2°E    |    |    |    |          | New Britain      |    |    |    |
|                     | Depth 76 km       |    |    |    | 26       | eP               | 07 | 51 | 37 |
| 25                  | e                 | 00 | 52 | 03 |          | epP              | 07 | 52 | 03 |
|                     | Kurile Islands    |    |    |    |          | eS               | 08 | 02 | 03 |
| 25                  | e                 | 01 | 10 | 03 |          | eSS              | 08 | 07 | 35 |
|                     | e                 | 01 | 13 | 03 |          | e                | 08 | 14 | 49 |
| 25                  | eP                | 01 | 15 | 15 |          | eLQ              | 08 | 16 | 23 |
|                     | e (S)             | 01 | 19 | 03 |          | eLR (NNW)        | 08 | 22 | 03 |
|                     | eLR               | 01 | 24 | 03 |          | Kurile Islands   |    |    |    |
|                     | Guatemala         |    |    |    |          | USCGS 07 38 54.1 |    |    |    |
|                     | USCGS 01 09 16.2  |    |    |    |          | 44.6°N 149.9°E   |    |    |    |
|                     | 14.4°N 90.1°W     |    |    |    |          | Depth 20 km      |    |    |    |
|                     | Depth 139 km      |    |    |    |          | Z 10, E 10, N 14 |    |    |    |
| 25                  | eP                | 01 | 30 | 30 | 26       | e (PS)           | 19 | 56 | 02 |
|                     | eS                | 01 | 40 | 43 |          | eLQ              | 20 | 11 | 42 |
|                     | eSS               | 01 | 46 | 35 |          | eLR (NW)         | 20 | 16 | 02 |
|                     | eLQ               | 01 | 55 | 03 |          | Kurile Islands   |    |    |    |
|                     | eLR (NNW)         | 02 | 02 | 33 |          | USCGS 19 32 34.2 |    |    |    |
|                     | Kurile Islands    |    |    |    |          | 44.6°N 150.1°E   |    |    |    |
|                     | USCGS 01 17 42.7  |    |    |    |          | Depth 51 km      |    |    |    |
|                     | 44.5°N 150.0°E    |    |    |    |          |                  |    |    |    |
|                     | Depth 78 km       |    |    |    | 27       | eLR              | 00 | 25 | 02 |
|                     | Z 3, E 3.5, N 4.5 |    |    |    |          |                  |    |    |    |
| 25                  | eSKS              | 11 | 42 | 31 | 27       | e (P)            | 18 | 02 | 22 |
|                     | eSKKS             | 11 | 44 | 07 |          | eS               | 18 | 09 | 12 |
|                     | eSS               | 11 | 53 | 55 |          | eLQ              | 18 | 13 | 22 |
|                     | eLQ               | 12 | 07 | 03 |          | eLR              | 18 | 19 | 02 |
|                     | eLR               | 12 | 15 | 03 |          | Peru             |    |    |    |
|                     | Kermadec Islands  |    |    |    |          | USCGS 17 52 16.5 |    |    |    |
|                     | USCGS 11 16 41.4° |    |    |    |          | 12.9°S 75.1°W    |    |    |    |
|                     | (continued)       |    |    |    |          | Depth 124 km     |    |    |    |

| Palisades, New York |                         |    | 31 |    |         | 1961                          |    |    |    |
|---------------------|-------------------------|----|----|----|---------|-------------------------------|----|----|----|
| Date                | Phase                   | h  | m  | s  | Date    | Phase                         | h  | m  | s  |
| Apr. 28             | eLQ                     | 01 | 20 | 02 | Apr. 30 | e                             | 04 | 59 | 11 |
|                     | eLR                     | 01 | 25 | 02 |         | eLQ                           | 05 | 04 | 21 |
|                     | Monterey Co., Calif.    |    |    |    |         | eLR                           | 05 | 05 | 31 |
|                     | USCGS 01 02 52.2        |    |    |    | 30      | eLQ                           | 05 | 28 | 31 |
|                     | 36.3°N 121.6°W          |    |    |    |         | eLR                           | 05 | 33 | 01 |
|                     | Depth 41 km             |    |    |    |         |                               |    |    |    |
| 28                  | eLR                     | 06 | 47 | 02 | 30      | eP                            | 07 | 40 | 21 |
| 28                  | eLQ                     | 07 | 35 | 42 |         | eS                            | 07 | 45 | 19 |
|                     | eLR                     | 07 | 38 | 02 |         | eLQ                           | 07 | 46 | 01 |
|                     |                         |    |    |    |         | eLR (NE)                      | 07 | 48 | 01 |
| 28                  | eL                      | 09 | 09 | 02 |         | North Atlantic Ocean          |    |    |    |
|                     | South Bolivia           |    |    |    |         | USCGS 07 33 53.5              |    |    |    |
| 28                  | eLQ                     | 14 | 18 | 02 |         | 52.0°N 31.9°W                 |    |    |    |
|                     | eLR                     | 14 | 22 | 22 |         | Depth 38 km                   |    |    |    |
|                     |                         |    |    |    |         | Z 11, E 14, N 10              |    |    |    |
| 28                  | e                       | 20 | 57 | 22 | 30      | eP                            | 11 | 28 | 11 |
|                     | e                       | 20 | 57 | 34 |         | eS                            | 11 | 38 | 27 |
| 29                  | eLR                     | 00 | 14 | 41 |         | eSS                           | 11 | 44 | 21 |
|                     |                         |    |    |    |         | eLQ                           | 11 | 51 | 11 |
| 29                  | eLQ                     | 06 | 42 | 01 |         | eLR (NW)                      | 11 | 57 | 01 |
|                     | eLR                     | 06 | 47 | 01 |         | Kurile Islands                |    |    |    |
| 29                  | eP                      | 09 | 27 | 06 |         | USCGS 11 15 19.8              |    |    |    |
|                     | epP                     | 09 | 27 | 14 |         | 44.6°N 149.7°E                |    |    |    |
|                     | ePP                     | 09 | 28 | 37 |         | Depth 70 km                   |    |    |    |
|                     | eS                      | 09 | 33 | 11 |         | Z 7.5, E 5, N 8               |    |    |    |
|                     | eSS                     | 09 | 36 | 29 | 30      | e                             | 14 | 27 | 45 |
|                     | eLR (WNW)               | 09 | 39 | 31 |         | eLR (NW)                      | 14 | 34 | 01 |
|                     | (Rg)                    | 09 | 43 | 51 | 30      | eSKKS                         | 15 | 13 | 45 |
|                     | Off coast N. California |    |    |    |         | ePS                           | 15 | 16 | 39 |
|                     | USCGS 09 19 28.3        |    |    |    |         | ePPS                          | 15 | 17 | 27 |
|                     | 40.6°N 127.5°W          |    |    |    |         | eSS                           | 15 | 22 | 27 |
|                     | Depth 26 km             |    |    |    |         | e (SSS)                       | 15 | 30 | 21 |
|                     | Z 23, E 23, N 27        |    |    |    |         | eLQ                           | 15 | 33 | 01 |
| 29                  | eLQ                     | 09 | 47 | 01 |         | eLR (WNW)                     | 15 | 39 | 01 |
|                     | eLR (NE)                | 09 | 51 | 01 |         | Samoa Islands region          |    |    |    |
|                     | USCGS 09 29 09.5        |    |    |    |         | USCGS 14 48 11.5              |    |    |    |
|                     | 71.3°N 7.4°W            |    |    |    |         | 15.3°S 174.4°W                |    |    |    |
|                     | Depth 14 km             |    |    |    |         | Depth 25 km                   |    |    |    |
|                     | Z 10.5, E 20, N 20      |    |    |    |         | Z 6, E 7, N 4                 |    |    |    |
|                     | Jan Mayen Island region |    |    |    | 30      | e                             | 16 | 29 | 03 |
| 29                  | eLQ                     | 17 | 12 | 21 | 30      | eS                            | 17 | 44 | 27 |
|                     | eLR                     | 17 | 16 | 01 |         | eLR (NW)                      | 17 | 49 | 01 |
| 30                  | eLQ                     | 01 | 29 | 21 |         | Off coast northern California |    |    |    |
|                     | eLR                     | 01 | 35 | 31 |         | USCGS 17 30 38.6              |    |    |    |
|                     |                         |    |    |    |         | (continued)                   |    |    |    |

Palisades, New York

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1961

| Date     | Phase          | h     | m     | s  |
|----------|----------------|-------|-------|----|
| Apr. 30  | 40.7°N 127.2°W | Dist. | 40.2° |    |
| (cont'd) | Depth 44 km    |       |       |    |
| 30       | eLR (NW)       | 18    | 55    | 01 |
| 30       | eL             | 22    | 38    | 41 |



LAMONT GEOLOGICAL OBSERVATORY  
COLUMBIA UNIVERSITY

PALISADES, NEW YORK



SEISMOLOGICAL BULLETIN

By

RUTH B. SIMON

1 May 1961 - 31 August 1961

L.G.O. Contribution No. 531





| Palisades, New York |                         |             | 2     |                                    |                 | 1961 |  |  |
|---------------------|-------------------------|-------------|-------|------------------------------------|-----------------|------|--|--|
| Date                | Phase                   | h m s       | Date  | Phase                              | h m s           |      |  |  |
| May 4               | eLQ                     | 07 00 01    | May 5 | eLQ                                | 23 12 12        |      |  |  |
|                     | eLR (SE)                | 07 01 41    |       | eLR                                | 23 17 42        |      |  |  |
| 4                   | eS                      | 07 12 37    | 6     | eLR                                | 14 48 03        |      |  |  |
|                     | eLQ                     | 07 14 01    |       |                                    |                 |      |  |  |
|                     | eLR (SE)                | 07 15 31    | 6     | eLR                                | 16 37 03        |      |  |  |
|                     | Atlantic Ocean          |             | 6     | ePS                                | 19 58 13        |      |  |  |
|                     | USCGS 07 00 32.9        |             |       | eLR (SE)                           | 20 08 43        |      |  |  |
|                     | 17.7°N 46.4°W           | Dist. 33.2° |       | Atlantic Ocean N. of Ascension Is. |                 |      |  |  |
|                     | Depth 19 km             |             |       | USCGS 19 38 04.6                   |                 |      |  |  |
| 4                   | eLR                     | 11 27 01    |       | 1.2°S 15.5°W                       | Dist. 67.1°     |      |  |  |
|                     | Tonga Islands           |             |       | Depth 24 km                        |                 |      |  |  |
| 4                   | i                       | 16 12 48    | 6     | eLR                                | 22 19 03        |      |  |  |
|                     |                         |             |       | Philippines                        |                 |      |  |  |
| 4                   | eLQ                     | 16 35 02    | 6     | ePKPPKP                            | 23 51 23        |      |  |  |
|                     | eLR                     | 16 43 02    | 7     | eLQ                                | 00 05 03        |      |  |  |
|                     | Sumatra                 |             |       | eLR (NW)                           | 00 11 03        |      |  |  |
| 4                   | i                       | 19 34 00    |       | New Hebrides                       |                 |      |  |  |
|                     | i                       | 19 34 23    |       | USCGS 23 13 29.5                   |                 |      |  |  |
| 4                   | i                       | 21 01 23    |       | 17.2°S 167.9°E                     | Dist. 122.0°    |      |  |  |
|                     | i                       | 21 01 45    |       | Depth 96 km                        |                 |      |  |  |
| 4                   | eLR (NW)                | 21 13 02    | 7     | ePP                                | 00 46 17        |      |  |  |
|                     |                         |             |       | ePKES                              | 00 58 03        |      |  |  |
| 4                   | eSS                     | 21 15 54    |       | eScSPKP                            | 00 59 03        |      |  |  |
|                     | eLQ                     | 21 19 02    |       | eSS                                | 01 04 03        |      |  |  |
|                     | eLR (NW)                | 21 20 02    |       | e                                  | 01 08 03        |      |  |  |
|                     | Off coast N. California |             |       | eLQ                                | 01 17 03        |      |  |  |
|                     | USCGS 20 59 08.8        |             |       | eLR (NW)                           | 01 23 33        |      |  |  |
|                     | 40.6°N 127.5°W          | Dist. 40.2° |       | Solomon Islands                    |                 |      |  |  |
|                     | Depth 87 km             |             |       | USCGS 00 25 40.8                   |                 |      |  |  |
| 5                   | eLR                     | 00 58 02    |       | 6.1°S 154.4°E                      | Dist. 124.9°    |      |  |  |
| 5                   | eLR                     | 06 06 42    |       | Depth 123 km                       | Mag 6 1/4-6 1/2 |      |  |  |
|                     |                         |             |       | Z- E 24 N 12                       |                 |      |  |  |
| 5                   | eLR (W)                 | 07 38 42    | 7     | ePKP                               | 04 51 49        |      |  |  |
|                     | Kermadec                |             |       | iPKP                               | 04 51 51        |      |  |  |
|                     |                         |             |       | epPKP                              | 04 52 07        |      |  |  |
| 5                   | eLR (SW)                | 09 44 22    |       | ePP                                | 04 55 13        |      |  |  |
|                     | Kermadec                |             |       | ePPP                               | 04 58 27        |      |  |  |
|                     |                         |             |       | eSKKS                              | 05 02 29        |      |  |  |
| 5                   | eLR (NW)                | 13 28 02    |       | eSS                                | 05 15 43        |      |  |  |
|                     | Off coast N. California |             |       | e                                  | 05 20 43        |      |  |  |
|                     |                         |             |       | e                                  | 05 27 03        |      |  |  |
| 5                   | eLR                     | 14 03 02    |       | e                                  | 05 33 23        |      |  |  |
|                     |                         |             |       | e                                  | 05 44 03        |      |  |  |
|                     |                         |             |       | eLR (NW)                           | 05 48 03        |      |  |  |
| 5                   | eLQ                     | 14 35 10    |       | Near coast Java                    |                 |      |  |  |
|                     | eLR (SW)                | 14 39 32    |       | USCGS 04 32 14.5                   |                 |      |  |  |
|                     | Kermadec                |             |       | 8.6°S 111.4°E                      | Dist. 147.8°    |      |  |  |
|                     | Z 6.5 E 15 N 2          |             |       | Depth 113 km                       |                 |      |  |  |
| 5                   | eLR                     | 16 28 02    | 7     | eLR (NW)                           | 06 23 03        |      |  |  |
|                     | Kermadec                |             |       | Off coast N. California            |                 |      |  |  |
| 5                   | i                       | 19 36 20    | 7     | ePKP                               | 10 41 48        |      |  |  |
|                     |                         |             |       | ePP                                | 10 43 39        |      |  |  |
| 5                   | eLR                     | 20 02 15    |       | ePKS                               | 10 45 11        |      |  |  |
|                     | Kermadec                |             |       | e (PKS)                            | 10 45 43        |      |  |  |
|                     |                         |             |       | eSKS                               | 10 49 15        |      |  |  |
| 5                   | i                       | 20 46 38    |       | eSS                                | 11 01 15        |      |  |  |
|                     |                         |             |       | eLQ                                | 11 16 23        |      |  |  |
|                     |                         |             |       | eLR (WNW)                          | 11 22 33        |      |  |  |
| 5                   | eLQ                     | 21 35 02    |       | Off coast Mindanao, P.I.           |                 |      |  |  |
|                     | eLR (SW)                | 21 38 02    |       | USCGS 10 22 43.7                   |                 |      |  |  |
|                     | Kermadec                |             |       | 5.8°N 126.8°E                      | Dist. 129.4°    |      |  |  |
|                     |                         |             |       | Depth 89 km                        |                 |      |  |  |

| Palisades, New York |                         |             | 3     |                         |              | 1961 |  |  |
|---------------------|-------------------------|-------------|-------|-------------------------|--------------|------|--|--|
| Date                | Phase                   | h m s       | Date  | Phase                   | h m s        |      |  |  |
| May 7               | eLR (S)                 | 13 16 03    | May 9 | eLQ                     | 12 20 13     |      |  |  |
|                     |                         |             |       | eLR (NW)                | 12 25 33     |      |  |  |
| 7                   | e                       | 15 40 17    |       | Off coast N. California |              |      |  |  |
|                     | eLR (NW)                | 15 46 23    | 9     | e                       | 15 20 53     |      |  |  |
|                     | New Britain region      |             |       | eLQ                     | 15 33 43     |      |  |  |
| 7                   | e                       | 15 55 47    |       | eLR                     | 15 36 03     |      |  |  |
|                     | e                       | 15 59 03    | 9     | eLQ                     | 16 03 23     |      |  |  |
|                     | eLR (NW)                | 16 01 23    |       | eLR                     | 16 06 43     |      |  |  |
| 7                   | eLR (NW)                | 16 39 03    | 9     | eLR                     | 16 27 33     |      |  |  |
|                     | Off coast N. California |             |       |                         |              |      |  |  |
| 7                   | eLR (SE)                | 17 58 23    | 9     | eLQ                     | 18 33 03     |      |  |  |
|                     |                         |             |       | eLR                     | 18 39 03     |      |  |  |
| 7                   | eLR                     | 18 44 43    | 9     | eLR                     | 22 37 23     |      |  |  |
| 7                   | eLR                     | 23 41 33    | 10    | eLQ                     | 03 44 03     |      |  |  |
|                     | Solomon Islands region  |             |       | eLR                     | 03 49 33     |      |  |  |
| 8                   | eLR                     | 02 22 03    | 10    | eSKS                    | 10 30 15     |      |  |  |
|                     | Argentina               |             |       | ePS                     | 10 33 15     |      |  |  |
| 8                   | eLR                     | 09 38 03    |       | eSS                     | 10 39 29     |      |  |  |
|                     | New Guinea              |             |       | eLQ                     | 10 51 03     |      |  |  |
| 8                   | eLR                     | 13 04 03    |       | eLR (NW)                | 10 55 23     |      |  |  |
|                     | Off coast N. California |             |       | Salmon Islands Region   |              |      |  |  |
| 8                   | eLR                     | 14 18 33    |       | USCGS 10 05 13.7        |              |      |  |  |
|                     |                         |             |       | 15.8°S 172.3°W          | Dist. 106.4° |      |  |  |
| 8                   | eP                      | 19 34 17    |       | Depth 52 km             |              |      |  |  |
|                     | e                       | 19 35 07    | 10    | eLR                     | 17 42 03     |      |  |  |
|                     | e                       | 19 35 31    | 10    | eLR                     | 18 41 23     |      |  |  |
|                     | ePPP                    | 19 38 09    |       |                         |              |      |  |  |
|                     | eS                      | 19 42 39    | 10    | e                       | 21 23 36     |      |  |  |
|                     | e                       | 19 44 11    |       |                         |              |      |  |  |
|                     | eSS                     | 19 47 11    | 11    | eLQ                     | 00 41 23     |      |  |  |
|                     | eLQ                     | 19 50 33    |       | eLR                     | 00 44 13     |      |  |  |
|                     | eLR                     | 19 52 43    |       |                         |              |      |  |  |
|                     | N. Chile                |             | 11    | ePKP                    | 01 11 06     |      |  |  |
|                     | USCGS 19 23 35.4        |             |       | Off coast Java          |              |      |  |  |
|                     | 24.3°S 69.7°W           | Dist. 64.8° |       | USCGS 00 51 24.2        |              |      |  |  |
|                     | Depth 48 km             | Mag. 5 1/4  |       | 8.4° S 112.5°E          | Dist. 146.5° |      |  |  |
|                     | Z- E 4.5 N 2.5          |             |       | Depth 39 km             |              |      |  |  |
| 8                   | eLR (N)                 | 22 10 03    | 11    | e                       | 05 13 15     |      |  |  |
|                     |                         |             |       | eLR                     | 05 19 03     |      |  |  |
| 9                   | e (PP)                  | 00 07 39    |       | Off coast N. California |              |      |  |  |
|                     | eS                      | 00 12 31    |       |                         |              |      |  |  |
|                     | eSS                     | 00 15 31    | 11    | eP                      | 08 50 23     |      |  |  |
|                     | eLR (NW)                | 00 18 03    |       | ePP                     | 08 53 19     |      |  |  |
|                     | Off coast Oregon        |             |       | eS                      | 09 00 18     |      |  |  |
|                     | USCGS 00 01 03.5        |             |       | ePS                     | 09 00 59     |      |  |  |
|                     | 43.7°N 127.8°W          | Dist. 39.4° |       | eSS                     | 09 05 07     |      |  |  |
|                     | Depth 47 km             |             |       | eLQ                     | 09 11 03     |      |  |  |
| 9                   | eL                      | 02 39 03    |       | eLR (SSE)               | 09 17 03     |      |  |  |
|                     |                         |             |       | Near coast S. Chile     |              |      |  |  |
| 9                   | eLR                     | 07 30 03    |       | USCGS 08 38 27.1        |              |      |  |  |
|                     |                         |             |       | 37.2° S 73.6° W         | Dist. 77.6°  |      |  |  |
| 9                   | eLR (SW)                | 09 16 03    |       | Depth 47 km             |              |      |  |  |
|                     | Kermadec Islands        |             | 11    | eLR                     | 15 13 03     |      |  |  |
| 9                   | e                       | 12 02 43    | 11    | eLR                     | 18 48 13     |      |  |  |
|                     | eLQ                     | 12 05 03    |       |                         |              |      |  |  |
|                     | eLR                     | 12 07 43    |       |                         |              |      |  |  |





| Palisades, New York |                         |                  | 6      |                            |              | 1961 |  |  |
|---------------------|-------------------------|------------------|--------|----------------------------|--------------|------|--|--|
| Date                | Phase                   | h m s            | Date   | Phase                      | h m s        |      |  |  |
| May 19              | eLQ                     | 04 27 24         | May 21 | eLR (WNW)                  | 17 07 04     |      |  |  |
|                     | eLR                     | 04 33 04         |        |                            |              |      |  |  |
|                     | Tonga Islands           |                  | 21     | eP                         | 17 50 04     |      |  |  |
|                     | USCGS 03 42 31.1        |                  |        | ePPP                       | 17 52 12     |      |  |  |
|                     | 15.8°S 172.8°W          | Dist. 107.1°     |        | eS                         | 17 56 10     |      |  |  |
|                     | Depth 25 km             |                  |        | eSS                        | 17 59 34     |      |  |  |
| 19                  | eP                      | 09 31 51         |        | eLQ                        | 18 00 34     |      |  |  |
|                     | epP                     | 09 32 06         |        | eLR (SW)                   | 18 02 44     |      |  |  |
|                     | ePP                     | 09 32 54         |        | Near coast Equador         |              |      |  |  |
|                     | eS                      | 09 36 56         |        | USCGS 17 41 28.2           |              |      |  |  |
|                     | e(PcS)                  | 09 37 36         |        | 3.1°S 80.9°W               | Dist. 44.3°  |      |  |  |
|                     | eLR (SSW)               | 09 40 04         |        | Depth 27 km                |              |      |  |  |
|                     | Off coast Nicaragua     |                  | 21     | ePKP                       | 21 59 38     |      |  |  |
|                     | USCGS 09 25 26.6        |                  |        | ePKP                       | 21 59 42     |      |  |  |
|                     | 11.3°N 88.3°W           | Dist. 32.4°      |        | eSSS                       | 22 27 32     |      |  |  |
|                     | Depth 34 km             | Mag. 4 1/2-4 3/4 |        | eSSSS                      | 22 36 10     |      |  |  |
|                     | Z 3 E 2.5 N 4           |                  |        | eLQ                        | 22 49 04     |      |  |  |
| 19                  | eLR                     | 12 27 04         |        | eLR (W)                    | 22 55 04     |      |  |  |
|                     |                         |                  |        | New South Wales, Australia |              |      |  |  |
| 19                  | eLR (WNW)               | 15 08 34         |        | USCGS 21 40 03.2           |              |      |  |  |
|                     |                         |                  |        | 34.3°S 150.4°E             | Dist. 144.7° |      |  |  |
|                     |                         |                  |        | Depth 27 km                |              |      |  |  |
| 19                  | eLQ                     | 17 25 04         | 22     | eLQ                        | 05 53 44     |      |  |  |
|                     | eLR (N)                 | 17 31 34         |        | eLR (SW)                   | 05 58 34     |      |  |  |
|                     | Ryukyu Islands          |                  |        |                            |              |      |  |  |
| 20                  | eLR                     | 01 18 04         | 22     | e                          | 09 13 14     |      |  |  |
|                     | Fox Islands, Aleutians  |                  |        | e                          | 09 19 20     |      |  |  |
| 20                  | eLQ                     | 12 29 44         |        | eLQ                        | 09 34 54     |      |  |  |
|                     | eLR                     | 12 36 34         |        | eLR (NW)                   | 09 40 04     |      |  |  |
|                     | Kurile Islands          |                  | 22     | e                          | 11 47 32     |      |  |  |
|                     |                         |                  |        | e                          | 11 49 36     |      |  |  |
| 20                  | ePKS                    | 18 13 44         |        | e                          | 12 16 18     |      |  |  |
|                     | eLQ                     | 18 37 44         |        | eLQ                        | 12 23 04     |      |  |  |
|                     | eLR (ESE)               | 18 44 04         |        | eLR                        | 12 29 04     |      |  |  |
|                     | Tanganyika              |                  | 22     | ePP                        | 14 03 44     |      |  |  |
|                     | USCGS 17 52 04.6        |                  |        | eSKS                       | 14 09 42     |      |  |  |
|                     | 6.5°S 31.7°E            | Dist. 106.5°     |        | eSKKS                      | 14 11 28     |      |  |  |
|                     | Depth 58 km             |                  |        | ePKKP                      | 14 13 10     |      |  |  |
| 21                  | eLR                     | 00 23 04         |        | ePS                        | 14 13 36     |      |  |  |
|                     |                         |                  |        | eSS                        | 14 19 20     |      |  |  |
| 21                  | eLQ                     | 03 13 34         |        | eLQ                        | 14 32 04     |      |  |  |
|                     | eLR                     | 03 16 04         |        | eLR (WSW)                  | 14 38 14     |      |  |  |
|                     |                         |                  |        | Tonga Islands              |              |      |  |  |
| 21                  | e                       | 03 38 56         |        | USCGS 13 44 35.8           |              |      |  |  |
|                     | e                       | 03 54 56         |        | 21.3°S 174.4°W             | Dist. 110.9° |      |  |  |
|                     | eLQ                     | 04 00 04         |        | Z 16 E 20 N 8              | Mag. 6 1/4   |      |  |  |
|                     | eLR (WNW)               | 04 01 04         |        |                            |              |      |  |  |
| 21                  | e                       | 08 12 20         | 22     | i                          | 16 23 00     |      |  |  |
|                     | eLQ                     | 08 17 24         |        |                            |              |      |  |  |
|                     | eLR (WNW)               | 08 19 04         | 22     | i                          | 17 24 17     |      |  |  |
|                     |                         |                  |        |                            |              |      |  |  |
| 21                  | eLQ                     | 11 08 34         | 22     | eP                         | 17 47 08     |      |  |  |
|                     | eLR                     | 11 12 04         |        | ePP                        | 17 51 54     |      |  |  |
|                     | Ryukyu Islands          |                  |        | epPP                       | 17 52 18     |      |  |  |
|                     |                         |                  |        | eSKS                       | 17 57 42     |      |  |  |
|                     |                         |                  |        | eSKS                       | 17 58 16     |      |  |  |
| 21                  | eSS                     | 15 31 48         |        | ePKKP                      | 18 01 28     |      |  |  |
|                     | eLR (WNW)               | 15 36 34         |        | ePS                        | 18 02 12     |      |  |  |
|                     | Off coast N. California |                  |        | ePPS                       | 18 02 58     |      |  |  |
|                     | USCGS 15 15 14.7        |                  |        | eSS                        | 18 08 24     |      |  |  |
|                     | 40.5°N 127.5°W          | Dist. 40.2°      |        | eSKKKS                     | 18 12 16     |      |  |  |
|                     | Depth 25 km             |                  |        | eLQ                        | 18 20 04     |      |  |  |
|                     |                         |                  |        | eLR (WSW)                  | 18 25 44     |      |  |  |
| 21                  | eLR (WNW)               | 16 05 34         |        | eLQ <sub>2</sub>           | 19 14 04     |      |  |  |
|                     |                         |                  |        | eLR <sub>2</sub>           | 19 28 04     |      |  |  |

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| Palisades, New York |                      |                  | 7      |                      |                   | 1961 |  |  |
|---------------------|----------------------|------------------|--------|----------------------|-------------------|------|--|--|
| Date                | Phase                | h m s            | Date   | Phase                | h m s             |      |  |  |
| May 22              | (continued)          |                  | May 23 | (continued)          |                   |      |  |  |
|                     | Tonga Islands Region |                  |        | ePcS                 | 16 57 26          |      |  |  |
|                     | USCGS 17 32 21.6     |                  |        | eLQ                  | 16 57 48          |      |  |  |
|                     | 22.8°S 176.1° W      | Dist. 113.5°     |        | eLR (S)              | 16 59 22          |      |  |  |
|                     | Depth 35 km          | Mag. 6 1/2       |        | Near coast Nicaragua |                   |      |  |  |
|                     | Z 28 E 34 N 19       |                  |        | USCGS 16 44 59.4     |                   |      |  |  |
|                     |                      |                  |        | 12.6°N 87.3°W        | Dist. 30.2°       |      |  |  |
| 22                  | eLR                  | 22 06 14         |        | Depth 138 km         | Mag. 5 1/4- 5 1/2 |      |  |  |
|                     |                      |                  |        | Z 9 E 14 N 15        |                   |      |  |  |
| 22                  | eLQ                  | 22 28 44         | 24     | eLQ                  | 00 50 04          |      |  |  |
|                     | eLR (WNW)            | 22 32 34         |        | eLR                  | 00 53 04          |      |  |  |
| 23                  | eLQ                  | 00 39 04         | 24     | eLQ                  | 01 34 04          |      |  |  |
|                     | eLR (SW)             | 00 40 54         |        | eLR                  | 01 37 04          |      |  |  |
|                     | Tonga Islands Region |                  |        |                      |                   |      |  |  |
| 23                  | eP                   | 02 56 55         | 24     | eLQ                  | 02 47 34          |      |  |  |
|                     | epP                  | 02 57 07         |        | eLR                  | 02 50 24          |      |  |  |
|                     | ePP                  | 02 59 20         | 24     | eLQ                  | 05 07 34          |      |  |  |
|                     | eS                   | 03 06 28         |        | eLR                  | 05 10 34          |      |  |  |
|                     | ePS                  | 03 06 48         |        |                      |                   |      |  |  |
|                     | ePPS                 | 03 07 30         | 24     | eLQ                  | 13 19 04          |      |  |  |
|                     | eSS                  | 03 12 04         |        | eLR                  | 13 21 44          |      |  |  |
|                     | eLQ                  | 03 17 34         |        |                      |                   |      |  |  |
|                     | eLR (ENE)            | 03 21 24         | 24     | eLR                  | 13 55 04          |      |  |  |
|                     | Dodecanese Islands   |                  |        | Off coast Oregon     |                   |      |  |  |
|                     | USCGS 02 45 16.0     |                  | 24     | eLR (WNW)            | 15 24 34          |      |  |  |
|                     | 36.4°N 28.3°E        | Dist. 75.2°      |        |                      |                   |      |  |  |
|                     | Depth 49 km          | Mag. 6 1/4       | 24     | i                    | 16 19 16          |      |  |  |
|                     | Z 18.5 E 23 N 36     |                  |        | i                    | 16 19 20          |      |  |  |
| 23                  | eP                   | 03 46 48         | 24     | eLR                  | 16 29 04          |      |  |  |
|                     | epP                  | 03 47 02         |        |                      |                   |      |  |  |
|                     | eLQ                  | 03 53 44         | 24     | i                    | 16 31 43          |      |  |  |
|                     | eLR (S)              | 03 56 04         |        |                      |                   |      |  |  |
|                     | Costa Rica           |                  | 24     | eLQ                  | 17 42 34          |      |  |  |
|                     | USCGS 03 40 26.1     |                  |        | eLR (W)              | 17 45 34          |      |  |  |
|                     | 9.8°N 84.0°W         | Dist. 32.2°      | 24     | eLQ                  | 18 18 34          |      |  |  |
|                     | Depth 136 km         | Mag. 5 1/4-5 1/2 |        | eLR (N)              | 18 23 04          |      |  |  |
|                     | Z 9 E 15.5 N 18.5    |                  | 24     | eLR                  | 18 34 04          |      |  |  |
| 23                  | e(P)                 | 03 49 31         | 24     | e                    | 18 37 55          |      |  |  |
|                     | e                    | 03 49 47         |        |                      |                   |      |  |  |
|                     | e                    | 03 49 58         | 24     | eLR (NE)             | 18 57 24          |      |  |  |
| 23                  | eLQ                  | 06 55 04         | 24     | eLQ                  | 19 18 34          |      |  |  |
|                     | eLR                  | 07 02 24         |        | eLR (W)              | 19 21 04          |      |  |  |
| 23                  | eLQ                  | 08 43 34         | 24     | e                    | 22 13 04          |      |  |  |
|                     | eLR (W)              | 08 46 04         |        | eL                   | 22 28 04          |      |  |  |
| 23                  | eLQ                  | 12 19 34         | 25     | eLR                  | 05 21 04          |      |  |  |
|                     | eLR                  | 12 21 48         |        | Near coast N. Chile  |                   |      |  |  |
| 23                  | eLQ                  | 14 33 04         | 25     | eLR                  | 05 52 04          |      |  |  |
|                     | eLR                  | 14 35 04         |        |                      |                   |      |  |  |
| 23                  | eP                   | 16 05 04         | 25     | eL                   | 07 23 04          |      |  |  |
|                     |                      |                  |        |                      |                   |      |  |  |
| 23                  | eP                   | 16 51 06         | 25     | eL                   | 10 41 04          |      |  |  |
|                     | iP                   | 16 51 07         |        |                      |                   |      |  |  |
|                     | ipP                  | 16 51 14         | 25     | eLQ                  | 12 25 34          |      |  |  |
|                     | isP                  | 16 51 30         |        | eLR                  | 12 27 04          |      |  |  |
|                     | ePP                  | 16 52 00         |        |                      |                   |      |  |  |
|                     | ePPP                 | 16 52 22         |        |                      |                   |      |  |  |
|                     | eS                   | 16 56 06         |        |                      |                   |      |  |  |
|                     | esS                  | 16 56 44         |        |                      |                   |      |  |  |

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| Palisades, New York |                           |             | 8      |                           |              | 1961 |  |  |
|---------------------|---------------------------|-------------|--------|---------------------------|--------------|------|--|--|
| Date                | Phase                     | h m s       | Date   | Phase                     | h m s        |      |  |  |
| May 25              | e                         | 13 36 24    | May 27 | eSKS                      | 07 41 59     |      |  |  |
|                     | e                         | 13 44 44    |        | eS                        | 07 42 33     |      |  |  |
|                     | eLR                       | 13 47 20    |        | eSS                       | 07 49 03     |      |  |  |
| 25                  | eLQ                       | 14 20 03    |        | e                         | 07 53 03     |      |  |  |
|                     | eLR                       | 14 26 03    |        | eLR                       | 08 02 03     |      |  |  |
| 25                  | i                         | 15 50 37    |        | N. Coast Honshu, Japan    |              |      |  |  |
| 25                  | eLQ                       | 18 28 23    |        | USCGS 07 18 12.2          |              |      |  |  |
|                     | eLR                       | 18 30 33    |        | 41.0°N 142.1°E            | Dist. 92.1°  |      |  |  |
|                     | Tonga Islands             |             |        | Depth 156 km              |              |      |  |  |
| 25                  | eLQ                       | 21 05 03    | 27     | eLQ                       | 08 03 03     |      |  |  |
|                     | eLR (WNW)                 | 21 08 03    |        | eLR (NW)                  | 08 11 03     |      |  |  |
| 25                  | eL                        | 22 36 23    |        | eSS                       | 17 32 53     |      |  |  |
|                     | Fiji                      |             |        | eSS <sub>2</sub>          | 17 45 43     |      |  |  |
| 26                  | e                         | 03 17 15    |        | e                         | 17 53 13     |      |  |  |
|                     | e                         | 03 21 43    |        | e                         | 17 55 43     |      |  |  |
| 26                  | eS                        | 03 44 33    |        | eLQ                       | 18 02 03     |      |  |  |
|                     | eSS                       | 03 47 43    |        | eLR (NE)                  | 18 10 03     |      |  |  |
|                     | eLQ                       | 03 56 03    |        | Near coast N. Sumatra     |              |      |  |  |
|                     | eLR (W)                   | 04 00 53    |        | USCGS 16 52 19.3          |              |      |  |  |
|                     | 350 mi. S. Easter Islands |             |        | 0.8°N 98.5°E              | Dist. 137.7° |      |  |  |
|                     | USCGS 03 22 08.6          |             | 27     | eLR (NE)                  | 18 43 03     |      |  |  |
|                     | 32.9°S 109.6°W            | Dist. 80.8° |        | eLR                       | 03 33 33     |      |  |  |
|                     | Depth 54 km               |             |        | New Guinea                |              |      |  |  |
| 26                  | eLQ                       | 05 10 03    | 28     | eLR                       | 05 27 03     |      |  |  |
|                     | eLR (W)                   | 05 15 03    |        | Riverside Co., California |              |      |  |  |
|                     | Easter Islands Region     |             | 28     | eLQ                       | 16 28 03     |      |  |  |
| 26                  | eL                        | 06 52 33    |        | eLR (W)                   | 16 30 03     |      |  |  |
|                     | Guatemala                 |             | 28     | eLQ                       | 17 31 03     |      |  |  |
| 26                  | eLQ                       | 11 04 03    |        | eLR (W)                   | 17 33 03     |      |  |  |
|                     | eLR (SW)                  | 11 10 03    |        | Gulf of California        |              |      |  |  |
| 26                  | e                         | 13 27 35    | 28     | eLR                       | 21 46 03     |      |  |  |
|                     | e                         | 13 27 59    | 28     | eLQ                       | 22 54 23     |      |  |  |
|                     | eLQ                       | 13 31 03    |        | eLR (W)                   | 22 58 03     |      |  |  |
|                     | eLR (SW)                  | 13 33 03    | 29     | eS                        | 00 41 33     |      |  |  |
| 26                  | eLQ                       | 14 42 33    |        | eSS                       | 00 46 19     |      |  |  |
|                     | eLR                       | 14 44 03    |        | eLQ                       | 00 53 03     |      |  |  |
| 26                  | i                         | 16 19 09    |        | eLR                       | 00 56 03     |      |  |  |
| 26                  | e(PKS)                    | 23 11 13    |        | Fox Islands, Aleutians    |              |      |  |  |
|                     | eSKKS                     | 23 14 03    |        | USCGS 00 22 55.6          |              |      |  |  |
|                     | eLR                       | 23 32 03    |        | 52.1° N 166.6°W           | Dist. 60.8°  |      |  |  |
|                     | Honshu, Japan             |             |        | Depth 67 km               |              |      |  |  |
|                     | USCGS 22 49 49.4          |             | 29     | eLQ                       | 05 15 33     |      |  |  |
|                     | 38.4°N 142.9°E            | Dist. 94.4° |        | eLR (W)                   | 05 20 03     |      |  |  |
|                     | Depth 60 km               |             | 29     | eLQ                       | 05 48 23     |      |  |  |
| 26                  | eLQ                       | 23 41 03    |        | eLR (NE)                  | 05 52 03     |      |  |  |
|                     | eLR                       | 23 47 03    | 29     | eP                        | 07 40 23     |      |  |  |
| 27                  | e                         | 00 45 29    |        | ePP                       | 07 42 31     |      |  |  |
|                     | e                         | 00 53 43    |        | eS                        | 07 50 23     |      |  |  |
| 27                  | eL                        | 01 50 03    |        | ePPS                      | 07 51 09     |      |  |  |
|                     |                           |             |        | eSS                       | 07 55 13     |      |  |  |
|                     |                           |             |        | eLQ                       | 08 01 13     |      |  |  |
|                     |                           |             |        | eLR (SE)                  | 08 07 33     |      |  |  |

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| Palisades, New York |                           |                    | 9      |                       |                | 1961 |  |  |
|---------------------|---------------------------|--------------------|--------|-----------------------|----------------|------|--|--|
| Date                | Phase                     | h m s              | Date   | Phase                 | h m s          |      |  |  |
| May 29              | (continued)               |                    | May 31 | ePPS                  | 19 48 33       |      |  |  |
|                     | S. Chile                  |                    |        | eSS                   | 19 54 03       |      |  |  |
|                     | USCGS 07 28 11.7          |                    |        | eSKKS                 | 19 54 43       |      |  |  |
|                     | 39.0°S 73.4°W             | Dist. 79.6°        |        | eSSS                  | 19 58 53       |      |  |  |
|                     | Depth 13 km               |                    |        | eLQ                   | 20 09 13       |      |  |  |
| 29                  | ePS                       | 11 19 03           |        | eLR (NW)              | 20 14 43       |      |  |  |
|                     | eSS                       | 11 24 43           |        | New Britain           |                |      |  |  |
|                     | e(SKKS)                   | 11 32 33           |        | USCGS 19 15 57.0      |                |      |  |  |
|                     | eLQ                       | 11 34 03           |        | 5.3°S 151.6°E         | Dist. 125.5°   |      |  |  |
|                     | eLR (ESE)                 | 11 39 33           |        | Depth 56 km           | Mag. 5 3/4 - 6 |      |  |  |
|                     | Ethiopia                  |                    |        | USCGS 10 52 01.2      |                |      |  |  |
|                     | USCGS 10 52 01.2          |                    | 31     | eLQ                   | 23 55 33       |      |  |  |
|                     | 10.6°N 39.4°E             | Dist. 99.5°        | June 1 | eLR (NW)              | 00 02 03       |      |  |  |
|                     | Depth 25 km               |                    | 1      | eLQ                   | 00 57 03       |      |  |  |
| 29                  | eLR                       | 17 59 43           |        | eLR (W)               | 01 00 03       |      |  |  |
|                     | Philippines               |                    | 1      | eLQ                   | 07 51 23       |      |  |  |
| 29                  | eS                        | 19 51 11           |        | eLR                   | 07 54 03       |      |  |  |
|                     | eSS                       | 19 57 33           | 1      | eLR                   | 09 02 53       |      |  |  |
|                     | eLQ                       | 20 06 03           |        | Kuriles               |                |      |  |  |
|                     | eLR (NE)                  | 20 12 33           | 1      | eP                    | 10 07 34       |      |  |  |
|                     | Ethiopia                  |                    |        | epP                   | 10 07 39       |      |  |  |
|                     | USCGS 19 26 05.5          |                    |        | e(PcP)                | 10 11 34       |      |  |  |
|                     | 10.4° N 40.0° E           | Dist. 100°         |        | eS                    | 10 11 35       |      |  |  |
|                     | Depth 52 km               |                    |        | e(S)                  | 10 12 06       |      |  |  |
| 29                  | eLR                       | 22 13 33           |        | eLQ                   | 10 12 27       |      |  |  |
| 30                  | eLR                       | 02 10 13           |        | eLR (SSE)             | 10 13 33       |      |  |  |
|                     | Near coast Dominican Rep. |                    | 30     | eLR                   | 04 42 43       |      |  |  |
|                     | USCGS 10 02 45.1          |                    | 30     | eLR                   | 13 59 43       |      |  |  |
|                     | 19.5°N 69.3°W             | Dist. 21.4°        |        | Easter Islands region |                |      |  |  |
|                     | Depth 53 km               | Mag. 4 1/4 - 4 1/2 | 30     | eL                    | 22 05 03       |      |  |  |
|                     | Z 2 E 2 Z 2.5             |                    | 31     | eLQ                   | 04 58 03       |      |  |  |
| 1                   | eLQ                       | 12 32 03           |        | eLR                   | 05 01 43       |      |  |  |
|                     | eLR                       | 12 39 03           | 31     | eLQ                   | 06 53 03       |      |  |  |
|                     | Ceram Islands             |                    |        | eLR                   | 06 56 03       |      |  |  |
| 1                   | eLR                       | 21 55 03           | 31     | eL                    | 08 28 53       |      |  |  |
| 1                   | eP                        | 23 43 13           | 31     | eLQ                   | 09 24 23       |      |  |  |
|                     | ePP                       | 23 47 25           |        | eLR                   | 09 26 03       |      |  |  |
|                     | ePPP                      | 23 49 19           | 31     | eL                    | 09 37 03       |      |  |  |
|                     | eSKS <sub>1</sub>         | 23 54 07           |        | eLR                   | 09 41 43       |      |  |  |
|                     | eSKS <sub>2</sub>         | 23 55 05           | 31     | eP                    | 14 24 29       |      |  |  |
|                     | ePS                       | 23 56 27           |        | ePP                   | 14 25 32       |      |  |  |
| 2                   | eSS                       | 00 01 43           |        | ePPP                  | 14 26 16       |      |  |  |
|                     | ePKKS                     | 00 05 11           |        | eS                    | 14 29 53       |      |  |  |
|                     | eLQ                       | 00 11 23           |        | ePcS                  | 14 30 47       |      |  |  |
|                     | eLR (ENE)                 | 00 15 53           |        | eSS                   | 14 32 35       |      |  |  |
|                     | eLR <sub>1</sub> (W)      | 01 32 03           |        | eLQ                   | 14 33 03       |      |  |  |
|                     | Ethiopia                  |                    |        | eLR (W)               | 14 34 55       |      |  |  |
|                     | USCGS 23 29 21.1          |                    |        | Lg                    | 14 36 03       |      |  |  |
|                     | 10.6°N 39.3°E             | Dist. 99.5°        |        | Lg                    | 14 38 03       |      |  |  |
|                     | Depth 51 km               | Mag. 6 1/2         |        | Gulf of California    |                |      |  |  |
|                     | Z 32 E 43 N 30            |                    |        | USCGS 14 17 43.8      |                |      |  |  |
| 2                   | eP                        | 05 05 05           |        | 29.8°N 114.0°W        | Dist. 34.2°    |      |  |  |
|                     | ePP                       | 05 09 11           |        | Depth 74 km           | Mag. 6         |      |  |  |
|                     | eSKS                      | 05 15 47           |        | Z 34 E 26 N 80        |                |      |  |  |
|                     | eSKKS                     | 05 16 25           |        |                       |                |      |  |  |
|                     | ePS                       | 05 18 09           |        |                       |                |      |  |  |
|                     | ePFS                      | 05 18 53           |        |                       |                |      |  |  |
|                     | eSS                       | 05 24 03           |        |                       |                |      |  |  |
|                     | eSSS                      | 05 31 27           |        |                       |                |      |  |  |
|                     | eLQ                       | 05 33 17           |        |                       |                |      |  |  |
|                     | eLR (ENE)                 | 05 39 33           |        |                       |                |      |  |  |

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| Palisades, New York |                  |              | 14      |                  |              | 1961 |  |  |
|---------------------|------------------|--------------|---------|------------------|--------------|------|--|--|
| Date                | Phase            | h m s        | Date    | Phase            | h m s        |      |  |  |
| June 18             | eLQ              | 08 27 36     | June 19 | e(PKKS)          | 17 37 27     |      |  |  |
|                     | eLR (WSW)        | 08 29 36     |         | eLR (NE)         | 17 45 07     |      |  |  |
|                     | S. Arizona       |              |         | Hindu Kush       |              |      |  |  |
|                     | USCGS 08 12 07.1 |              |         | USCGS 17 04 30.3 |              |      |  |  |
|                     | 32.2°N 112.5°W   | Dist. 32.4°  |         | 36.6°N 71.0°E    | Dist. 95.5°  |      |  |  |
|                     | Depth 25 km      |              |         | Depth 151 km     |              |      |  |  |
| 18                  | eLR              | 10 52 06     | 19      | eSKS             | 22 38 17     |      |  |  |
|                     | Iran             |              |         | eSS              | 22 43 27     |      |  |  |
|                     |                  |              |         | eLQ              | 22 51 07     |      |  |  |
| 18                  | ePP              | 14 14 56     |         | eLR (NW)         | 22 53 47     |      |  |  |
|                     | ePPP             | 14 17 12     |         | Kamchatka        |              |      |  |  |
|                     | eSKS             | 14 19 44     |         | USCGS 22 17 13.5 |              |      |  |  |
|                     | eSKKKS           | 14 22 38     |         | 53.7°N 160.7°E   | Dist. 74.3°  |      |  |  |
|                     | ePPS             | 14 26 18     |         | Depth 25 km      |              |      |  |  |
|                     | ePKKS            | 14 27 34     | 20      | eLQ              | 04 03 07     |      |  |  |
|                     | eSS              | 14 31 12     |         | eLR (E)          | 04 10 47     |      |  |  |
|                     | esSS             | 14 34 06     |         | Gulf of Aden     |              |      |  |  |
|                     | eSSS             | 14 35 46     | 20      | eLR (SW)         | 10 02 27     |      |  |  |
|                     | e                | 14 45 46     |         |                  |              |      |  |  |
|                     | eLQ              | 14 47 36     | 20      | ePPS             | 14 59 17     |      |  |  |
|                     | eLR (W)          | 14 55 06     |         | eSSS             | 15 05 19     |      |  |  |
|                     | Kermadec         |              |         | eSSS             | 15 08 57     |      |  |  |
|                     | USCGS 13 55 16.6 |              |         | eLQ              | 15 20 07     |      |  |  |
|                     | 31.3°S 179.8°E   | Dist. 121.0° |         | eLR (SW)         | 15 25 47     |      |  |  |
|                     | Depth 434 km     |              |         | Loyalty Islands  |              |      |  |  |
| 18                  | eLQ              | 19 48 26     |         | USCGS 14 27 02.6 |              |      |  |  |
|                     | eLR (E)          | 19 51 46     |         | 21.8°S 169.3°E   | Dist. 124.3° |      |  |  |
|                     |                  |              |         | Depth 64 km      |              |      |  |  |
| 18                  | eSS              | 22 48 38     | 20      | eLQ              | 21 33 37     |      |  |  |
|                     | eSKKS            | 22 49 46     |         | eLR (SW)         | 21 37 07     |      |  |  |
|                     | eSSS             | 22 52 52     |         | Honduras         |              |      |  |  |
|                     | eLQ              | 23 00 06     | 21      | eP               | 04 03 25     |      |  |  |
|                     | eLR (SW)         | 23 03 26     |         | ePP              | 04 03 47     |      |  |  |
|                     | S. Pacific Ocean |              |         | eS               | 04 08 17     |      |  |  |
|                     | USCGS 22 13 30.0 |              |         | esS              | 04 08 34     |      |  |  |
|                     | 56.7°S 141.6°E   | Dist. 112.7° |         | eLQ              | 04 10 27     |      |  |  |
|                     | Depth 92 km      |              |         | eLR (SW)         | 04 12 37     |      |  |  |
| 19                  | eLR              | 01 02 20     |         | N.W. Honduras    |              |      |  |  |
|                     | Tonga            |              |         | USCGS 03 57 44.0 |              |      |  |  |
| 19                  | e                | 01 46 18     |         | 15.3°N 87.3°W    | Dist. 28.3°  |      |  |  |
|                     | e(LR) (W)        | 01 51 34     |         | Depth 114 km     |              |      |  |  |
| 19                  | eSS              | 02 23 18     | 21      | eLQ              | 07 24 37     |      |  |  |
|                     | eLQ              | 02 39 06     |         | eLR (NE)         | 07 30 37     |      |  |  |
|                     | eLR (N)          | 02 44 36     |         | Iran             |              |      |  |  |
|                     | Philippines      |              | 21      | eLQ              | 08 28 07     |      |  |  |
|                     | USCGS 01 45 29.9 |              |         | eLR (NW)         | 08 35 07     |      |  |  |
|                     | 12.6°N 121.9°E   | Dist. 124.3° |         | E. New Guinea    |              |      |  |  |
|                     | Depth 120 km     |              | 21      | eL               | 13 26 19     |      |  |  |
| 19                  | eLR (NE)         | 03 37 06     | 21      | eLQ              | 16 38 07     |      |  |  |
| 19                  | eLQ              | 05 17 26     |         | eLR (NE)         | 16 42 07     |      |  |  |
|                     | eLR              | 05 24 26     | 21      | iP               | 20 41 57     |      |  |  |
| 19                  | e                | 08 02 40     |         | N. Coast Java    |              |      |  |  |
|                     | e                | 08 15 46     |         | USCGS 20 25 00.9 |              |      |  |  |
|                     | eLQ              | 08 21 26     |         | 7.6°S 110.0°E    | Dist. 146.9° |      |  |  |
|                     | eLR (NW)         | 08 27 06     |         | Depth 163 km     |              |      |  |  |
| 19                  | eSKS             | 17 27 59     |         |                  |              |      |  |  |
|                     | ePS              | 17 30 07     |         |                  |              |      |  |  |
|                     | eSS              | 17 35 07     |         |                  |              |      |  |  |

| Palisades, New York |                               |                                       | 15      |                           |              | 1961 |  |  |
|---------------------|-------------------------------|---------------------------------------|---------|---------------------------|--------------|------|--|--|
| Date                | Phase                         | h m s                                 | Date    | Phase                     | h m s        |      |  |  |
| June 21             | i                             | 20 44 29                              | June 24 | eLR (NE)                  | 17 10 37     |      |  |  |
|                     | e                             | 20 44 57                              |         | N. Coast New Guinea       |              |      |  |  |
|                     | e                             | 20 47 57                              |         | USCGS 16 19 23.7          |              |      |  |  |
| 21                  | eLQ                           | 21 08 07                              |         | 4.6°S 144.9°E             | Dist. 130.0° |      |  |  |
|                     | eLR (NW)                      | 21 12 37                              |         | Depth 212 km              |              |      |  |  |
| 21                  | eL                            | 21 29 37                              | 25      | e                         | 03 00 37     |      |  |  |
|                     |                               |                                       |         | e                         | 03 14 27     |      |  |  |
|                     |                               |                                       |         | eLQ                       | 03 19 07     |      |  |  |
| 22                  | eLQ                           | 01 24 07                              |         | eLR                       | 03 26 07     |      |  |  |
|                     | eLR (NE)                      | 01 28 07                              |         | Honshu, Japan             |              |      |  |  |
|                     | Northern-Albania - Yugoslavia |                                       |         | USCGS 02 29 29.9          |              |      |  |  |
|                     | Border                        |                                       |         | 40.8°N 144.1°E            | Dist. 91.4°  |      |  |  |
|                     |                               |                                       |         | Depth 57 km               |              |      |  |  |
| 22                  | eLQ                           | 06 31 07                              | 25      | e(S)                      | 11 10 17     |      |  |  |
|                     | eLR (NW)                      | 06 35 07                              |         | N. Coast Colombia         |              |      |  |  |
|                     | Loyalty Islands               |                                       |         | USCGS 10 58 24.0          |              |      |  |  |
| 22                  | eS                            | 20 12 11                              |         | 10.8°N 76°W               | Dist. 29.9°  |      |  |  |
|                     | eLR                           | 20 15 07                              |         | Depth 76 km               |              |      |  |  |
|                     | Off Coast El Salvador         |                                       | 25      | ePP                       | 17 05 35     |      |  |  |
|                     | USCGS 20 00 13.1              |                                       |         | ePPP                      | 17 07 37     |      |  |  |
|                     | 12.8°N 89.9°W                 | Dist. 31.3°                           |         | eSKKKS                    | 17 13 07     |      |  |  |
|                     | Depth 99 km                   |                                       |         | ePS                       | 17 15 15     |      |  |  |
| 23                  | e                             | 01 21 19                              |         | eSS                       | 17 20 51     |      |  |  |
|                     | eLR                           | 01 25 47                              |         | eSSS                      | 17 24 41     |      |  |  |
|                     |                               |                                       |         | eLQ                       | 17 32 37     |      |  |  |
| 23                  | eP                            | 09 03 29                              |         | eLR (NW)                  | 17 38 27     |      |  |  |
|                     | ePP                           | 09 04 55                              |         | North of Marianas Islands |              |      |  |  |
|                     | eS                            | 09 09 35                              |         | USCGS 16 46 32.9          |              |      |  |  |
|                     | eSS                           | 09 12 19                              |         | 21.7°N 143.1°E            | Dist. 108.5° |      |  |  |
|                     | eLR (WNW)                     | 09 15 07                              |         | Depth 13 km               |              |      |  |  |
|                     | Off Coast Oregon              |                                       | 26      | eLQ                       | 03 33 07     |      |  |  |
|                     | USCGS 08 55 55.2              |                                       |         | eLR                       | 03 39 07     |      |  |  |
|                     | 43.9°N 128.9°W                | Dist. 40.1°                           | 26      | ePKP                      | 07 21 51     |      |  |  |
|                     | Depth 56 km                   |                                       |         | ePPP                      | 07 25 47     |      |  |  |
|                     | E - E 32 N 27                 | Mag. 5 <sup>1</sup> / <sub>6</sub>    |         | ePKKS                     | 07 35 41     |      |  |  |
| 23                  | i                             | 15 10 42                              |         | eSS                       | 07 40 39     |      |  |  |
| 24                  | eP                            | 05 14 07                              |         | eSSS                      | 07 45 27     |      |  |  |
|                     | ePP                           | 05 14 59                              |         | eLQ                       | 07 54 07     |      |  |  |
|                     | ePPP                          | 05 15 55                              |         | eLR (N)                   | 08 00 27     |      |  |  |
|                     | eS                            | 05 19 39                              |         | Loyalty Islands           |              |      |  |  |
|                     | eLQ                           | 05 20 35                              |         | USCGS 07 02 57.7          |              |      |  |  |
|                     | eLR (WSW)                     | 05 22 37                              |         | 21.3°S 170.1°E            | Dist. 122.9° |      |  |  |
|                     | Near Coast El Salvador        |                                       |         | Depth 89 km               |              |      |  |  |
|                     | USCGS 05 07 56.0              |                                       | 26      | eLQ                       | 13 12 59     |      |  |  |
|                     | 13.6°N 90.2°W                 | Dist. 30.3°                           |         | eLR (W)                   | 13 14 37     |      |  |  |
|                     | Depth 90 km                   | Mag 4 <sup>1</sup> / <sub>6</sub> - 5 |         | Bonja, California         |              |      |  |  |
|                     | Z 3 E 4 N 4                   |                                       |         | USCGS 12 56 56.6          |              |      |  |  |
| 24                  | ePKS                          | 09 59 27                              |         | 27.1°N 112.9°W            | Dist. 34.9°  |      |  |  |
|                     | eSS                           | 10 15 37                              |         | Depth 60 km               |              |      |  |  |
|                     | eSSS                          | 10 20 47                              | 26      | eLR                       | 14 47 06     |      |  |  |
|                     | e                             | 10 32 37                              |         | Tonga Islands             |              |      |  |  |
|                     | eLQ                           | 10 35 07                              | 26      | eP                        | 14 58 34     |      |  |  |
|                     | eLR (N)                       | 10 42 27                              |         | eS                        | 15 07 38     |      |  |  |
|                     | Sumatra                       |                                       |         | ePTS                      | 15 08 32     |      |  |  |
|                     | USCGS 09 36 08.8              |                                       |         | eSS                       | 15 12 46     |      |  |  |
|                     | 4.1°N 97.5°E                  | Dist. 134.6°                          |         | eSSS                      | 15 15 26     |      |  |  |
|                     | Depth 188 km                  |                                       |         | eLQ                       | 15 17 14     |      |  |  |
| 24                  | eLQ                           | 15 47 07                              |         | eLR (NW)                  | 15 20 26     |      |  |  |
|                     | eLR                           | 15 53 07                              |         | Aleutians                 |              |      |  |  |
| 24                  | eSS                           | 16 57 37                              |         | USCGS 14 47 26.1          |              |      |  |  |
|                     | eLQ                           | 17 05 37                              |         |                           |              |      |  |  |



| Palisades, New York |                    |              | 16      |                         |              | 1961 |  |  |
|---------------------|--------------------|--------------|---------|-------------------------|--------------|------|--|--|
| Date                | Phase              | h m s        | Date    | Phase                   | h m s        |      |  |  |
| June 26             | Continued          |              | June 29 | eLR                     | 06 52 26     |      |  |  |
|                     | 52.4°N 174.5°E     | Dist. 69.8°  |         |                         |              |      |  |  |
|                     | Depth 60 km        | Mag 5½ - 5¼  | 29      | eLR                     | 09 24 26     |      |  |  |
|                     | * Z 6, E 7, N 6    |              |         |                         |              |      |  |  |
| 26                  | eLQ                | 16 56 06     | 29      | eP                      | 09 38 20     |      |  |  |
|                     | eLR                | 16 57 46     |         | ePKP                    | 09 41 47     |      |  |  |
|                     | Colombia           |              |         | ePP                     | 09 43 18     |      |  |  |
|                     |                    |              |         | ePFS                    | 09 45 00     |      |  |  |
| 26                  | e                  | 18 43 00     |         | eSKS <sub>1</sub>       | 09 4* 48     |      |  |  |
|                     | e                  | 18 43 21     |         | eSKKS                   | 09 50 10     |      |  |  |
|                     |                    |              |         | ePS                     | 09 52 54     |      |  |  |
| 27                  | eLR                | 03 55 06     |         | e                       | 10 00 18     |      |  |  |
|                     | Peru-Brazil Border |              |         | eSS                     | 10 04 32     |      |  |  |
|                     |                    |              |         | eLQ                     | 10 14 18     |      |  |  |
|                     |                    |              |         | eLR(WNW)                | 10 19 58     |      |  |  |
| 27                  | ePP                | 07 23 02     |         | eLR <sub>2</sub>        | 11 14 36     |      |  |  |
|                     | ePPP               | 07 25 18     |         | New Hebrides            |              |      |  |  |
|                     | eSKS               | 07 28 58     |         | USCGS 09 22 55.8        |              |      |  |  |
|                     | eSKKS              | 07 30 32     |         | 13.8°S 166.0°E          |              |      |  |  |
|                     | ePS                | 07 32 38     |         | Depth 37 km             | Dist. 121.7° |      |  |  |
|                     | ePPS               | 07 33 40     |         | Z 5 E 5 N 3             | Mag 5½ - 5¼  |      |  |  |
|                     | eSS                | 07 38 42     | 29      | eP                      | 14 13 10     |      |  |  |
|                     | eSSS               | 07 42 36     |         | ePcP                    | 14 13 29     |      |  |  |
|                     | eLQ                | 07 50 14     |         | eS                      | 14 21 42     |      |  |  |
|                     | eLR (N)            | 07 57 26     |         | ePTS                    | 14 22 12     |      |  |  |
|                     | Yunan Prov., China |              |         | eLQ                     | 14 29 22     |      |  |  |
|                     | USCGS 07 03 42.2   | Dist. 111.0° |         | eLR(NW)                 | 14 32 06     |      |  |  |
|                     | 27.8°N 99.4°E      |              |         | Aleutians               |              |      |  |  |
|                     | Depth 33 km        |              |         | USCGS 12 02 42.5        |              |      |  |  |
|                     | * Z 5, E 5, N 5    | Mag 5½ - 6   |         | 52.2°N 173.4°W          | Dist. 63.9°  |      |  |  |
| 27                  | eLR                | 11 41 36     |         | Depth 76 km             |              |      |  |  |
|                     | Kermadec           |              | 29      | eLR(NW)                 | 17 39 26     |      |  |  |
| 27                  | eLQ                | 12 33 36     | 29      | eP                      | 22 10 50     |      |  |  |
|                     | eLR                | 12 35 06     |         | eS                      | 22 18 30     |      |  |  |
| 27                  | eLR                | 15 31 06     |         | eSS                     | 22 22 56     |      |  |  |
|                     |                    |              |         | eLQ                     | 22 24 06     |      |  |  |
| 27                  | eLR                | 13 29 06     |         | eLR(NNE)                | 22 26 26     |      |  |  |
|                     |                    |              |         | Severnaya Zemlya Region |              |      |  |  |
| 27                  | i                  | 19 49 26     |         | USCGS 22 01 21.0        | Dist. 54.16° |      |  |  |
|                     |                    |              |         | 85.0°N 97.3°E           |              |      |  |  |
| 27                  | e                  | 23 19 46     |         | Depth 11 km             |              |      |  |  |
|                     | e                  | 23 23 14     | 30      | i                       | 22 22 42     |      |  |  |
|                     | e(LR)              | 23 25 42     |         |                         |              |      |  |  |
| 23                  | eLR                | 05 24 06     | July 1  | eS                      | 00 20 36     |      |  |  |
|                     | China              |              |         | eLQ                     | 00 29 15     |      |  |  |
|                     |                    |              |         | eLR                     | 00 32 30     |      |  |  |
| 23                  | eLR                | 07 15 06     |         | Unimak Isl.             |              |      |  |  |
|                     |                    |              |         | USCGS 00 02 39.2        |              |      |  |  |
| 23                  | e                  | 13 08 10     |         | 55.9°N 164.3°W          | Dist. 58.2°  |      |  |  |
|                     | eLR                | 13 19 06     |         | Depth 34 km             |              |      |  |  |
| 23                  | eLQ                | 15 54 36     | 1       | eP                      | 13 20 14     |      |  |  |
|                     | eLR                | 15 59 06     |         | eS                      | 13 28 01     |      |  |  |
|                     |                    |              |         | eLQ                     | 13 34 06     |      |  |  |
| 23                  | eLR                | 16 25 46     |         | eLR(S)                  | 13 37 00     |      |  |  |
|                     |                    |              |         | Near Coast Peru         |              |      |  |  |
| 23                  | eLR                | 19 28 36     |         | USCGS 13 10 46.6        | Dist. 55.7°  |      |  |  |
|                     |                    |              |         | 15.3°S 75.0°W           |              |      |  |  |
| 23                  | eLR                | 19 36 46     |         | Depth 145 km            |              |      |  |  |
| 29                  | eLQ                | 02 08 05     | 1       | i                       | 22 38 02     |      |  |  |
|                     | eLR(NW)            | 02 16 36     |         |                         |              |      |  |  |

| Palisades, New York |                   |              | 17     |                        |               | 1961 |  |  |
|---------------------|-------------------|--------------|--------|------------------------|---------------|------|--|--|
| Date                | Phase             | h m s        | Date   | Phase                  | h m s         |      |  |  |
| July 2              | eLQ               | 00 21 00     | July 5 | Continued              |               |      |  |  |
|                     | eLR               | 00 37 25     |        | Ryukyu Islands         |               |      |  |  |
|                     | Aleutians         |              |        | USCGS 02 22 02.9       |               |      |  |  |
| 2                   | eLR               | 02 50 30     |        | 29.2°N 129.5°E         | Dist. 106.9°  |      |  |  |
|                     | Hokkaido, Japan   |              |        | Depth 97 km            |               |      |  |  |
| 2                   | eSS               | 17 25 06     | 5      | eLR                    | 05 14 14      |      |  |  |
|                     | eLQ               | 17 38 00     |        | Windward Islands       |               |      |  |  |
|                     | eLR (WNW)         | 17 44 30     | 6      | eLR                    | 00 32 06      |      |  |  |
|                     | New Hebrides      |              |        | eLR                    | 05 28 26      |      |  |  |
|                     | USCGS 16 47 22.7  |              |        |                        |               |      |  |  |
|                     | 13.8°S 166.1°E    | Dist. 121.7° | 6      | eP                     | 22 24 57      |      |  |  |
|                     | Depth 33 km       |              |        | iPKP                   | 22 28 26      |      |  |  |
| 3                   | eLR               | 08 36 26     |        | iPP                    | 22 30 03      |      |  |  |
|                     |                   |              |        | i                      | 22 31 17      |      |  |  |
| 3                   | e                 | 12 28 36     |        | iPPS                   | 22 41 29      |      |  |  |
|                     | eLR               | 12 34 46     |        | iSS                    | 22 47 15      |      |  |  |
| 3                   | eLR               | 15 40 46     |        | iSSS                   | 22 51 04      |      |  |  |
|                     |                   |              |        | eLR                    | 23 06 27      |      |  |  |
| 4                   | e                 | 03 44 06     |        | New Hebrides Islands   |               |      |  |  |
|                     | eLR               | 03 56 06     |        | USCGS 22 09 31.4       | Dist. 123.1°  |      |  |  |
|                     |                   |              |        | 20.0°S 169.0°E         | Mag 6½ - 6¼   |      |  |  |
| 4                   | eS                | 05 08 05     | 7      | ePKP                   | 13 29 53      |      |  |  |
|                     | eLQ               | 05 12 30     |        | ePP                    | 13 31 49      |      |  |  |
|                     | eLR (WNW)         | 05 14 55     |        | ePKS                   | 13 33 04      |      |  |  |
|                     | (Lg)              | 05 16 56     |        | eSS                    | 13 49 14      |      |  |  |
|                     | W. Nevada         |              |        | LQ                     | 14 03 13      |      |  |  |
|                     | USCGS 04 56 03.7  | Dist. 35.0°  |        | LR                     | 14 09 45      |      |  |  |
|                     | 40.8°N 118.0°W    |              |        | New Britain            |               |      |  |  |
|                     | Depth 61 km       |              |        | USCGS 13 10 43.8       | Dist. 127.6°  |      |  |  |
| 4                   | eSKS              | 06 35 56     |        | 5.7°S 149.7°E          | Mag 6½        |      |  |  |
|                     | ePS               | 06 39 06     |        | Depth 57 km            |               |      |  |  |
|                     | eSS               | 06 45 06     | 7      | ePP                    | 22 40 01      |      |  |  |
|                     | eLQ               | 06 55 06     |        | ePKS                   | 22 41 28      |      |  |  |
|                     | eLR(NW)           | 07 02 26     |        | eScSP                  | 22 49 35      |      |  |  |
|                     | Marianas          |              |        | ePPS                   | 22 51 42      |      |  |  |
|                     | USCGS 06 10 44.8  | Dist. 110.6° |        | ePKKS                  | 22 52 30      |      |  |  |
|                     | 17.9°N 146.4°E    |              |        | eSS                    | 22 57 26      |      |  |  |
|                     | Depth 145 km      |              |        | eSSS                   | 23 01 42      |      |  |  |
| 4                   | eLR               | 09 33 06     |        | e                      | 23 05 18      |      |  |  |
|                     |                   |              |        | e                      | 23 09 15      |      |  |  |
| 4                   | eS                | 11 21 06     |        | eLQ                    | 23 10 18      |      |  |  |
|                     | eLQ               | 11 24 36     |        | eLR(NW)                | 23 18 17      |      |  |  |
|                     | eLR(WNW)          | 11 26 36     |        | Loyalty Islands        |               |      |  |  |
|                     | (Lg)              | 11 29 06     |        | USCGS 22 19 34.2       |               |      |  |  |
|                     | W. Nevada         |              |        | 20.1°S 169.2°E         | Dist. 123.12° |      |  |  |
|                     | USCGS 11 09 10.6  | Dist. 33.0°  |        | Depth 89 km            | Mag 5 - 5¼    |      |  |  |
|                     | 40.8°N 117.8°W    |              |        | Z 1.5 E 1.5 N 2        |               |      |  |  |
|                     | Depth 43 km       |              | 8      | ePP                    | 02 55 52      |      |  |  |
| 4                   | eLQ               | 17 25 00     |        | ePKS                   | 02 57 25      |      |  |  |
|                     | eLR               | 17 27 30     |        | eSKS                   | 03 01 07      |      |  |  |
|                     |                   |              |        | eSKKS                  | 03 03 01      |      |  |  |
| 4                   | e                 | 20 00 46     |        | ePKKP                  | 03 04 08      |      |  |  |
|                     | eLR               | 20 29 52     |        | eScSP                  | 03 05 36      |      |  |  |
|                     | Macquarie Islands |              |        | ePPS                   | 03 07 11      |      |  |  |
| 5                   | e                 | 03 02 16     |        | ePKKS                  | 03 08 17      |      |  |  |
|                     | e                 | 03 05 03     |        | eSS                    | 03 13 37      |      |  |  |
|                     | e                 | 03 11 15     |        | (eSSS)                 | 03 17 00      |      |  |  |
|                     | e                 | 03 21 54     |        | (eSSS)                 | 03 17 50      |      |  |  |
|                     | e                 | 03 29 32     |        | eLQ                    | 03 26 34      |      |  |  |
|                     | eLR               | 03 39 00     |        | eLR <sub>1</sub> (WNW) | 03 32 07      |      |  |  |
|                     |                   |              |        | eLR <sub>2</sub> (ESE) | 04 27 40      |      |  |  |
|                     |                   |              |        | Loyalty Islands        |               |      |  |  |





| Palisades, New York |                             |              | 20      |                      |              | 1961 |  |  |
|---------------------|-----------------------------|--------------|---------|----------------------|--------------|------|--|--|
| Date                | Phase                       | h m s        | Date    | Phase                | h m s        |      |  |  |
| July 17             | eLR (NE)                    | 06 02 30     | July 19 | e                    | 00 31 06     |      |  |  |
|                     |                             |              |         | Ryukyu Islands       |              |      |  |  |
| 17                  | eP                          | 09 15 09     |         |                      |              |      |  |  |
|                     | ePP                         | 09 16 10     | 19      | e                    | 04 40 00     |      |  |  |
|                     | eS                          | 09 20 51     |         | Sandwich Islands     |              |      |  |  |
|                     | eLQ                         | 09 24 04     | 19      | e                    | 11 35 41     |      |  |  |
|                     | eLR (SW)                    | 09 25 00     |         | Ryukyu Islands       |              |      |  |  |
|                     | Off Coast Mexico            |              | 19      | eLR                  | 11 40 36     |      |  |  |
|                     | USCGS 09 08 02.1            |              |         |                      |              |      |  |  |
|                     | 16.5°N 105.0°W              | Dist. 36.7°  | 19      | eL                   | 18 53 30     |      |  |  |
|                     | Depth 60 km                 |              |         | Samoa                |              |      |  |  |
| 17                  | eLR                         | 11 15 30     | 19      | e                    | 23 08 06     |      |  |  |
| 17                  | eS                          | 14 20 11     |         | eLR                  | 23 12 02     |      |  |  |
|                     | eSS                         | 14 23 43     |         | Aleutians            |              |      |  |  |
|                     | eLQ                         | 14 25 44     | 20      | e                    | 03 17 47     |      |  |  |
|                     | eLR (SE)                    | 14 27 53     |         | Ryukyu Islands       |              |      |  |  |
|                     | Mid Atlantic Ocean          |              | 20      | ePKP                 | 07 18 00     |      |  |  |
|                     | USCGS 14 02 48.2            |              |         | eLR                  | 07 41 16     |      |  |  |
|                     | 1.8°N 29.5°W                | Dist. 56.1°  |         | Philippines          |              |      |  |  |
|                     | Depth 25 km                 |              |         | USCGS 07 00 19.9     |              |      |  |  |
| 17                  | eLQ                         | 15 32 56     |         | 10.3°N 124.9°E       | Dist. 126.3° |      |  |  |
|                     | eLR                         | 15 36 06     |         | Depth 25 km          |              |      |  |  |
|                     | Kirghiz SSR                 |              | 20      | eL                   | 07 46 30     |      |  |  |
|                     | USCGS 14 53 28.4            |              |         | Kermadec             |              |      |  |  |
|                     | 41.2°N 72.4°E               | Dist. 92.7°  | 20      | eLR                  | 20 54 10     |      |  |  |
|                     | Depth 67 km                 |              |         |                      |              |      |  |  |
| 17                  | eS                          | 16 45 04     | 20      | eLR                  | 04 03 10     |      |  |  |
|                     | eSS                         | 16 51 46     |         |                      |              |      |  |  |
|                     | eSKKS                       | 16 57 30     | 21      | e                    | 04 44 18     |      |  |  |
|                     | eLQ                         | 17 02 51     |         | eLR                  | 04 47 18     |      |  |  |
|                     | eLR                         | 17 10 38     | 21      | e                    | 08 21 30     |      |  |  |
|                     | Near E. Coast Honshu, Japan |              |         | eLR                  | 08 40 30     |      |  |  |
|                     | USCGS 16 20 22.6            |              |         | Santa Cruz Islands   |              |      |  |  |
|                     | 35.7°N 141.2°E              | Dist. 96.9°  |         | USCGS 07 44 09.1     |              |      |  |  |
|                     | Depth 75 km                 |              |         | 11.3°S 166.0°E       | Dist. 119.7° |      |  |  |
| 18                  | eLR                         | 08 13 52     |         | Depth 95 km          |              |      |  |  |
|                     | Tonga Islands Region        |              | 21      | eLR                  | 14 04 40     |      |  |  |
| 18                  | eLR                         | 10 06 38     |         | New Hebrides         |              |      |  |  |
| 18                  | eLR                         | 10 21 22     | 21      | eLR                  | 13 13 00     |      |  |  |
| 18                  | iP                          | 14 17 49     | 21      | e                    | 19 36 10     |      |  |  |
|                     | epP                         | 14 18 02     |         | e(LR)                | 19 46 50     |      |  |  |
|                     | ePP                         | 14 21 59     |         | Ryukyu Islands       |              |      |  |  |
|                     | ePPP                        | 14 24 24     |         | USCGS 18 50 50.3     |              |      |  |  |
|                     | e(PKS)                      | 14 24 50     |         | 29.6°N 131.6°E       | Dist. 105.4° |      |  |  |
|                     | ePKS                        | 14 25 48     |         | Depth 16 km          |              |      |  |  |
|                     | eSKS                        | 14 28 26     | 21      | e                    | 23 03 10     |      |  |  |
|                     | eSKKS                       | 14 29 39     |         | Ryukyu Islands       |              |      |  |  |
|                     | ePS                         | 14 31 23     |         | USCGS 22 39 53.2     |              |      |  |  |
|                     | ePPS                        | 14 32 45     |         | 29.6°N 131.6°E       | Dist. 105.4° |      |  |  |
|                     | eSS                         | 14 37 11     |         | Depth 32 km          |              |      |  |  |
|                     | eSSS                        | 14 41 26     | 22      | eLR                  | 03 39 10     |      |  |  |
|                     | eLQ                         | 14 48 50     |         | Tonga Islands Region |              |      |  |  |
|                     | eLR(NNW)                    | 14 53 46     | 22      | eLR                  | 08 15 15     |      |  |  |
|                     | N. Ryukyu Islands           |              |         |                      |              |      |  |  |
|                     | USCGS 14 03 36.5            |              |         |                      |              |      |  |  |
|                     | 29.4°N 131.6°E              | Dist. 106.3° |         |                      |              |      |  |  |
|                     | Depth 21 km                 | Mag 6½ - 6%  |         |                      |              |      |  |  |
|                     | Z 36, E 30, N 32°           |              |         |                      |              |      |  |  |

| Palisades, New York |                                  |              | 21      |                        |              | 1961 |  |  |
|---------------------|----------------------------------|--------------|---------|------------------------|--------------|------|--|--|
| Date                | Phase                            | h m s        | Date    | Phase                  | h m s        |      |  |  |
| July 22             | eLR                              | 11 22 00     | July 24 | eLR                    | 18 11 55     |      |  |  |
|                     | Tonga Islands                    |              |         |                        |              |      |  |  |
| 22                  | eLR                              | 14 48 00     | 25      | e                      | 02 08 21     |      |  |  |
|                     | N.E. Afghanistan                 |              |         | eLR                    | 02 32 10     |      |  |  |
| 22                  | eLR                              | 18 56 00     |         | New Hebrides           |              |      |  |  |
|                     | S. of Tasmania                   |              |         | USCGS 01 50 53.2       |              |      |  |  |
| 23                  | eLR                              | 00 21 00     |         | 18.3°S 168.3°E         | Dist. 122.7° |      |  |  |
|                     | Jalisco, Mexico                  |              |         | Depth 99 km            |              |      |  |  |
| 23                  | eLR                              | 12 02 00     | 25      | eL                     | 05 25 30     |      |  |  |
|                     | New Britain                      |              |         | eL                     | 06 25 15     |      |  |  |
| 23                  | eLR                              | 12 17 00     | 25      | eLQ                    | 09 04 25     |      |  |  |
|                     |                                  |              |         | eLR                    | 09 13 20     |      |  |  |
| 23                  | e                                | 14 24 10     |         | Indian Ocean           |              |      |  |  |
|                     | e                                | 14 35 42     | 25      | eSKKS                  | 12 28 45     |      |  |  |
|                     | eLR                              | 14 44 29     |         | eLQ                    | 12 34 35     |      |  |  |
|                     | New Hebrides                     |              |         | eLR                    | 12 55 20     |      |  |  |
|                     | USCGS 14 03 39.8                 |              |         | Formosa                |              |      |  |  |
|                     | 18.5°S 168.2°E                   | Dist. 122.7° |         | USCGS 12 00 59.6       |              |      |  |  |
|                     | Depth 44 km                      |              |         | 21.0°N 125.6°E         | Dist. 110.1° |      |  |  |
| 23                  | iP(dil W)                        | 14 47 33     |         | Depth 61 km            |              |      |  |  |
|                     | ePPP                             | 14 51 03     | 25      | eSKKS                  | 18 26 29     |      |  |  |
|                     | iS                               | 14 55 22     |         | S. Coast Java          |              |      |  |  |
|                     | eLR(WSW)                         | 15 04 00     |         | USCGS 17 56 48.4       |              |      |  |  |
|                     | Pacific Ocean, 2000 NW Galapagos |              |         | 8.7°S 110.5°E          | Dist. 147.9° |      |  |  |
|                     | USCGS 14 38 03.5                 |              |         | Depth 245 km           |              |      |  |  |
|                     | 6.9°N 123.5°W                    | Dist. 55.2°  | 25      | ePKP                   | 18 57 48     |      |  |  |
|                     | Depth 89 km                      |              |         | eSS                    | 19 17 30     |      |  |  |
| 23                  | iP (comp WNW)                    | 22 06 34     |         | eLR                    | 19 42 35     |      |  |  |
|                     | iPKP                             | 22 10 01     |         | N. Celebes             |              |      |  |  |
|                     | ePP (8 sec)                      | 22 11 35     |         | USCGS 18 39 24.1       |              |      |  |  |
|                     | eSKKS                            | 22 18 35     |         | 0.0 124.7°E            | Dist. 155.7° |      |  |  |
|                     | ePS                              | 22 21 50     |         | Depth 43 km            |              |      |  |  |
|                     | iPPS                             | 22 23 11     | 26      | eLR (SW)               | 02 12 40     |      |  |  |
|                     | eSS                              | 22 28 30     |         | S.E. Easter Islands    |              |      |  |  |
|                     | eSSS                             | 22 32 35     | 26      | ePP                    | 09 40 17     |      |  |  |
|                     | eLR                              | 22 41 05     |         | eScSP                  | 09 49 05     |      |  |  |
|                     | eLR (22 sec from WNW)            | 22 48 05     |         | eSS                    | 09 56 55     |      |  |  |
|                     | New Hebrides Islands             |              |         | eLR                    | 10 15 55     |      |  |  |
|                     | USCGS 21 51 07.5                 |              |         | N. Island, New Zealand |              |      |  |  |
|                     | 18.3°S 168.3°E                   | Dist. 122.7° |         | USCGS 09 18 59.9       |              |      |  |  |
|                     | Depth 44 km                      | Mag 7        |         | 37.1°S 177.3°E         | Dist. 126.2° |      |  |  |
|                     | Z 85, E 80, N 80°                |              |         | Depth 100 km           |              |      |  |  |
| 24                  | eLR                              | 07 10 05     | 26      | eLR (SW)               | 13 16 12     |      |  |  |
| 24                  | ePKP                             | 09 07 21     | 26      | eLR (SW)               | 14 09 30     |      |  |  |
|                     | ePKS                             | 09 10 46     | 27      | eSSS                   | 02 43 05     |      |  |  |
|                     | ePPP                             | 09 11 55     |         | eLQ                    | 02 55 05     |      |  |  |
|                     | eSKKS                            | 09 16 45     |         | eLR                    | 02 56 05     |      |  |  |
|                     | eSS                              | 09 28 05     |         | Kermadec               |              |      |  |  |
|                     | eLR                              | 09 51 35     |         | USCGS 02 07 24.4       |              |      |  |  |
|                     | N. Celebes                       |              |         | 30.4°S 178.7°W         | Dist. 119.7° |      |  |  |
|                     | USCGS 08 48 13.8                 | Dist. 135.2° |         | Depth 482 km           |              |      |  |  |
|                     | 0 124.1°E                        |              | 24      | eLR                    | 10 39 05     |      |  |  |
|                     | Depth 159 km                     |              | 24      | eLR                    | 10 57 35     |      |  |  |
| 24                  | eLR                              | 10 39 05     | 27      | eLR                    | 06 38 45     |      |  |  |
| 24                  | eLR                              | 10 57 35     |         | Bolivia-Chile Border   |              |      |  |  |





| Palisades, New York |                                   |              | 22      | 1961                            |              |  |
|---------------------|-----------------------------------|--------------|---------|---------------------------------|--------------|--|
| Date                | Phase                             | h m s        | Date    | Phase                           | h m s        |  |
| July 27             | eLQ                               | 11 04 05     | July 29 | Continued                       |              |  |
| 27                  | eLR                               | 16 31 18     |         | eSKS                            | 16 52 46     |  |
|                     |                                   |              |         | eSKKKS                          | 16 54 44     |  |
|                     |                                   |              |         | ePS                             | 16 56 52     |  |
| 27                  | eP                                | 18 43 33     |         | eSS                             | 17 03 06     |  |
|                     | e                                 | 18 43 44     |         | eSSS                            | 17 06 46     |  |
|                     | Aegean Sea                        |              |         | eLQ                             | 17 13 36     |  |
| 27                  | eLR                               | 21 23 22     |         | eLR (SW)                        | 17 20 46     |  |
|                     |                                   |              |         | Tonga Islands                   |              |  |
| 28                  | ep                                | 01 13 18     |         | USCGS 16 27 19.0                |              |  |
|                     | P(Z) 14 sec 2.5 mic comp S        |              |         | 23.9°S 176.1°W                  | Dist. 114.2° |  |
|                     | ip                                | 01 13 18     |         | Depth 23 km                     |              |  |
|                     | ipP                               | 01 13 52     | 29      | e                               | 21 29 36     |  |
|                     | esP                               | 01 14 06     |         | eLQ                             | 21 35 18     |  |
|                     | ePP                               | 01 15 04     |         | eLR                             | 21 37 26     |  |
|                     | iPcS                              | 01 18 44     | 29      | eLR                             | 22 39 06     |  |
|                     | iS                                | 01 19 33     | 29      | e                               | 23 56 16     |  |
|                     | esS                               | 01 20 11     |         | Flores Sea                      |              |  |
|                     | isSS                              | 01 23 01     |         | USCGS 23 35 50                  |              |  |
|                     | eLQ                               | 01 23 26     |         | 6.8°S 119.1°E                   | Dist. 144.2° |  |
|                     | eLR                               | 01 25 36     |         | Depth 175 km                    |              |  |
|                     | eLR <sub>2</sub>                  | 01 37 06     | 30      | eLQ                             | 08 58 46     |  |
|                     | Ecuador                           |              |         | eLR                             | 09 00 56     |  |
|                     | USCGS 01 05 30.0                  |              |         | New Guinea                      |              |  |
|                     | 2.2°S 77.1°W                      | Dist. 42.9°  | 31      | eLQ                             | 00 24 26     |  |
|                     | Depth 136 km                      |              |         | eLR (WNW)                       | 00 27 06     |  |
| 28                  | ePP (WNW)                         | 06 32 11     |         | San Luis Obispo Co., California |              |  |
|                     | e                                 | 06 33 06     |         | USCGS 00 07 07.0                |              |  |
|                     | ePKS                              | 06 33 46     |         | 35.5°N 120.4°W                  | Dist. 56.5°  |  |
|                     | eSKS                              | 06 37 36     |         | Depth 23 km                     |              |  |
|                     | eSKKS                             | 06 39 06     | 31      | eLR                             | 25 57 06     |  |
|                     | ePKKP                             | 06 40 21     |         | Aug 1                           |              |  |
|                     | eScSP                             | 06 41 32     |         | e                               | 00 08 36     |  |
|                     | ePPS                              | 06 43 36     |         | e                               | 00 15 00     |  |
|                     | ePKKS                             | 06 44 33     |         | eLR                             | 00 32 36     |  |
|                     | eSS                               | 06 49 08     |         | 1                               |              |  |
|                     | e                                 | 06 52 06     |         | eL                              | 02 08 26     |  |
|                     | e                                 | 06 53 26     |         | New Hebrides                    |              |  |
|                     | e                                 | 06 54 16     |         | 1                               |              |  |
|                     | e                                 | 06 59 06     |         | ePcS                            | 03 29 30     |  |
|                     | eLQ                               | 07 02 36     |         | eLQ                             | 03 30 06     |  |
|                     | eLR                               | 07 09 06     |         | eLR                             | 03 31 54     |  |
|                     | New Hebrides                      |              |         | North Atlantic Ocean            |              |  |
|                     | USCGS 06 11 38.7                  |              |         | USCGS 03 16 11.2                |              |  |
|                     | 18.5°S 167.7°E                    | Dist. 123.3° |         | 15.5°N 46.6°W                   | Dist. 34.9°  |  |
|                     | Depth 41 km                       |              |         | Depth 48 km                     |              |  |
| 28                  | iP(WSW)                           | 10 20 56     | 1       | eP                              | 05 54 26     |  |
|                     | ePP                               | 10 22 06     |         | ePKP                            | 05 58 47     |  |
|                     | eS                                | 10 26 40     |         | ePP                             | 06 00 23     |  |
|                     | eSn                               | 10 28 36     |         | ePKS                            | 06 02 10     |  |
|                     | eLQ                               | 10 29 46     |         | ePPP                            | 06 03 06     |  |
|                     | eLR                               | 10 30 46     |         | ePKKP                           | 06 09 06     |  |
|                     | Pacific Ocean, W. Jalisco, Mexico |              |         | ePS                             | 06 10 30     |  |
|                     | USCGS 10 13 51.1                  |              |         | ePPS                            | 06 11 54     |  |
|                     | 20.0°N 109.2°W                    | Dist. 36.4°  |         | eSS                             | 06 17 08     |  |
|                     | Depth 42 km                       | Mag 5.1      |         | e(PKPPKP)                       | 06 17 46     |  |
| 28                  | eLR                               | 10 55 16     |         | eSSS                            | 06 21 22     |  |
| 29                  | eLR(WSW)                          | 11 27 06     |         | eLQ                             | 06 31 12     |  |
| 29                  | eP                                | 16 42 26     |         | eLR (NW)                        | 06 36 36     |  |
|                     | ePP                               | 16 47 12     |         | eLR <sub>2</sub>                | 07 30 06     |  |

| Palisades, New York |                   |              | 23    | 1961              |              |  |
|---------------------|-------------------|--------------|-------|-------------------|--------------|--|
| Date                | Phase             | h m s        | Date  | Phase             | h m s        |  |
| Aug 1               | Continued         |              | Aug 3 | iP (dil from SSE) | 03 13 03     |  |
|                     | Solomon Islands   |              |       | e                 | 03 13 12     |  |
|                     | USCGS 05 39 53.2  |              |       | epP               | 03 13 27     |  |
|                     | 9.8°S 160.5°E     | Dist. 123.5° |       | esP               | 03 13 34     |  |
|                     | Depth 50 km       | Mag 6¼ - 6½  |       | i                 | 03 13 58     |  |
|                     | Z --, E 18, N 24  |              |       | eS                | 03 17 14     |  |
|                     |                   |              |       | i                 | 03 17 30     |  |
| 1                   | ePKP              | 07 39 06     |       | eLQ               | 03 17 46     |  |
|                     | eLR               | 08 16 06     |       | eLR (SSE)         | 03 18 34     |  |
|                     | Sandwich Islands  |              |       | e(PcS)            | 03 20 12     |  |
|                     | USCGS 07 21 12.3  |              |       | T                 | 03 34 58     |  |
|                     | 56.8°S 25.1°W     | Dist. 105.9° |       | T (max)           | 03 36 46     |  |
|                     | Depth 44 km       |              |       | Puerto Rico       |              |  |
| 1                   | eLQ               | 10 18 06     |       | USCGS 03 08 02.3  |              |  |
|                     | eLR               | 10 24 06     |       | 18.2°N 66.2°W     | Dist. 23.9°  |  |
|                     | Sandwich Islands  |              |       | Depth 141 km      | Mag 4        |  |
| 1                   | ePP               | 14 38 06     | 3     | e                 | 06 14 24     |  |
|                     | Near Coast Mexico |              |       | eLQ               | 06 24 06     |  |
|                     | USCGS 14 30 37.3  |              |       | eLR               | 06 27 36     |  |
|                     | 19.1°N 104.1°W    | Dist. 33.8°  | 3     | ePKP              | 07 11 00     |  |
|                     | Depth 58 km       |              |       | ePP               | 07 13 48     |  |
| 1                   | eLR               | 20 29 06     |       | ePKS              | 07 14 48     |  |
|                     | Solomon Islands   |              |       | eSKS              | 07 18 12     |  |
| 2                   | eSKS              | 01 42 14     |       | eScSPKP           | 07 26 38     |  |
|                     | ePS               | 01 45 30     |       | eSS               | 07 33 22     |  |
|                     | eSS               | 01 51 24     |       | e                 | 07 37 32     |  |
|                     | eSSS              | 01 55 06     |       | eLR (NW)          | 07 55 26     |  |
|                     | eLQ               | 02 02 26     |       | eLR <sub>2</sub>  | 08 38 36     |  |
|                     | eLR (SW)          | 02 09 06     |       | Ceram             |              |  |
|                     | S. Pacific Ocean  |              |       | USCGS 06 31 44.1  |              |  |
|                     | USCGS 01 17 08.1  |              |       | 3.5°S 130.8°E     | Dist. 156.0° |  |
|                     | 53.3°S 134.9°W    | Dist. 107.4° |       | Depth 22 km       |              |  |
|                     | Depth 22 km       |              | 3     | eLR               | 14 36 26     |  |
| 2                   | eSKKS             | 02 57 38     | 3     | eLR               | 16 15 36     |  |
|                     | ePS               | 02 59 15     |       | Kermadec          |              |  |
|                     | e                 | 03 15 06     | 4     | ePS               | 00 03 10     |  |
|                     | eLQ               | 03 18 46     |       | ePPS              | 00 04 34     |  |
|                     | eLR (SE)          | 03 24 06     |       | eSS               | 00 10 12     |  |
|                     | Sandwich Islands  |              |       | eSSS              | 00 15 06     |  |
|                     | USCGS 02 31 24.8  |              |       | eLQ               | 00 23 06     |  |
|                     | 56.7°S 24.8°W     | Dist. 105.9° |       | eLR (NW)          | 00 28 26     |  |
|                     | Depth 25 km       |              |       | Marianas Islands  |              |  |
| 2                   | eLR               | 04 55 26     |       | USCGS 23 33 37.7  |              |  |
|                     | Sandwich Islands  |              |       | 12.1°N 143.8°E    | Dist. 116.7° |  |
| 2                   | eLQ               | 12 48 46     |       | Depth 20 km       |              |  |
|                     | eLR               | 12 55 26     | 4     | eL                | 07 35 06     |  |
|                     | Kurite Islands    |              |       | Japan             |              |  |
| 2                   | eLR               | 14 16 56     | 4     | eLR               | 08 03 06     |  |
|                     | N. Peru           |              | 4     | eLQ               | 11 04 36     |  |
| 2                   | eLR               | 17 13 06     |       | eLR               | 11 08 36     |  |
|                     | Aleutians         |              | 4     | eS                | 11 35 52     |  |
| 2                   | eLR               | 19 13 06     |       | eLQ               | 11 37 54     |  |
| 2                   | eL                | 21 12 06     |       | eLR (SW)          | 11 39 06     |  |
|                     | New Hebrides      |              |       | S. Coast Mexico   |              |  |
| 2                   | eLQ               | 22 55 06     |       | USCGS 11 24 12.8  |              |  |
|                     | eLR               | 23 00 26     |       | 15.2°N 95.3°W     | Dist. 31.7°  |  |
|                     |                   |              |       | Depth 24 km       |              |  |
| 3                   | eLQ               | 01 27 06     |       |                   |              |  |
|                     | eLR               | 01 31 06     |       |                   |              |  |
|                     | Gulf of Aden      |              |       |                   |              |  |

| Palisades, New York |                         |              | 24    |                      |              | 1961 |  |  |
|---------------------|-------------------------|--------------|-------|----------------------|--------------|------|--|--|
| Date                | Phase                   | h m s        | Date  | Phase                | h m s        |      |  |  |
| Aug 4               | eLR                     | 14 52 57     | Aug 5 | Continued            |              |      |  |  |
|                     |                         |              |       | eS                   | 09 45 45     |      |  |  |
| 4                   | eLQ                     | 17 13 37     |       | ePPS                 | 09 46 27     |      |  |  |
|                     | eLR                     | 17 16 47     |       | eScS                 | 09 47 27     |      |  |  |
|                     | W. Nevada               |              |       | eSS                  | 09 50 27     |      |  |  |
|                     | USCGS 16 56 09.1        |              |       | eLQ                  | 09 52 27     |      |  |  |
|                     | 39.0°N 117.7°W          | Dist. 32.8°  |       | eLR (SSE)            | 09 56 17     |      |  |  |
|                     | Depth 12 km             |              |       | Chile-Bolivia Border |              |      |  |  |
| 4                   | e                       | 18 31 35     |       | USCGS 09 27 45.5     |              |      |  |  |
|                     | Loyalty Islands         |              |       | 18.8°S 68.2°W        | Dist. 59.9°  |      |  |  |
|                     |                         |              |       | Depth 113 km         |              |      |  |  |
| 4                   | eP                      | 18 41 17     | 5     | eLQ                  | 17 25 37     |      |  |  |
|                     | eS                      | 18 46 37     |       | eLR                  | 17 29 17     |      |  |  |
|                     | eLR (ENE)               | 18 49 07     |       |                      |              |      |  |  |
|                     | N. Atlantic Ocean       |              | 5     | eLR                  | 19 58 07     |      |  |  |
|                     | USCGS 18 35 20.8        |              |       | Burma                |              |      |  |  |
|                     | 34.8°N 58.7°W           | Dist. 28.0°  |       |                      |              |      |  |  |
|                     | Depth 26 km             |              | 6     | eLR                  | 01 02 15     |      |  |  |
| 4                   | e                       | 20 46 47     | 6     | eLR                  | 04 14 37     |      |  |  |
| 4                   | eP                      | 23 05 27     | 6     | eLR                  | 06 25 37     |      |  |  |
|                     | ePP                     | 23 09 03     |       |                      |              |      |  |  |
|                     | ePPP                    | 23 11 03     | 6     | eLR                  | 09 20 37     |      |  |  |
|                     | eSKS                    | 23 15 47     |       | Crete                |              |      |  |  |
|                     | eSKKS                   | 23 16 07     |       |                      |              |      |  |  |
|                     | e(PPS)                  | 23 18 03     | 6     | eLR                  | 10 41 27     |      |  |  |
|                     | eSS                     | 23 22 07     |       |                      |              |      |  |  |
|                     | eLQ                     | 23 29 47     | 6     | eLR                  | 11 44 27     |      |  |  |
|                     | eLR (NW)                | 23 35 27     |       | Celebes              |              |      |  |  |
|                     | Kurile Islands          |              | 6     | e                    | 13 39 51     |      |  |  |
|                     | USCGS 22 52 49.2        |              |       |                      |              |      |  |  |
|                     | 45.3°N 151.1°E          | Dist. 85.4°  | 6     | e                    | 14 18 12     |      |  |  |
|                     | Depth 20 km             |              |       | e                    | 14 19 35     |      |  |  |
| 5                   | eP                      | 02 34 56     |       | e                    | 14 23 07     |      |  |  |
|                     | epP                     | 02 35 10     |       | e                    | 14 53 37     |      |  |  |
|                     | ePcP                    | 02 36 01     |       | eLR                  | 14 59 57     |      |  |  |
|                     | eS                      | 02 41 51     |       | Celebes              |              |      |  |  |
|                     | esS                     | 02 42 15     |       |                      |              |      |  |  |
|                     | e                       | 02 43 07     | 6     | eLQ                  | 19 24 07     |      |  |  |
|                     | eSS                     | 02 46 03     |       | eLR                  | 19 27 37     |      |  |  |
|                     | eLQ                     | 02 48 07     |       |                      |              |      |  |  |
|                     | eLR (NNW)               | 02 50 07     | 7     | ePKP                 | 04 42 07     |      |  |  |
|                     | Alaska, Kenai Peninsula |              |       | ePP                  | 04 44 07     |      |  |  |
|                     | USCGS 02 26 22.4        |              |       | ePKS                 | 04 45 25     |      |  |  |
|                     | 60.5°N 148.6°W          | Dist. 48.5°  |       | ePPP                 | 04 46 57     |      |  |  |
|                     | Depth 105 km            |              |       | eSKS                 | 04 48 31     |      |  |  |
| 5                   | eLR                     | 06 38 07     |       | eSS                  | 05 03 07     |      |  |  |
|                     | Kamchatka               |              |       | eSSS                 | 05 10 07     |      |  |  |
|                     |                         |              |       | eLQ                  | 05 22 37     |      |  |  |
| 5                   | eSS                     | 07 19 21     |       | eLR (N)              | 05 30 07     |      |  |  |
|                     | eLQ                     | 07 30 07     |       | Celebes              |              |      |  |  |
|                     | eLR (SW)                | 07 38 07     |       | USCGS 04 22 20.5     |              |      |  |  |
|                     | Kermadec Islands        |              |       | 2.7°S 121.6°E        | Dist. 139.5° |      |  |  |
|                     | USCGS 06 43 05.0        |              |       | Depth 18 km          |              |      |  |  |
|                     | 28.2°S 176.7°W          | Dist. 117.2° | 7     | eSKS                 | 12 48 03     |      |  |  |
|                     | Depth 66 km             |              |       | ePS                  | 12 52 07     |      |  |  |
| 5                   | eP                      | 09 37 49     |       | eSS                  | 12 58 47     |      |  |  |
|                     | epP                     | 09 38 15     |       | eLQ                  | 13 11 27     |      |  |  |
|                     | ePcP                    | 09 38 33     |       | eLR                  | 13 19 19     |      |  |  |
|                     | ePP                     | 09 40 23     |       | Kermadec Islands     |              |      |  |  |
|                     | ePPP                    | 09 41 47     |       | USCGS 12 22 23.3     |              |      |  |  |
|                     | (continued)             |              |       | 28.1°S 176.5°W       | Dist. 117.2° |      |  |  |
|                     |                         |              |       | Depth 39 km          |              |      |  |  |

| Palisades, New York |                                 |              | 25    |                     |              | 1961 |  |  |
|---------------------|---------------------------------|--------------|-------|---------------------|--------------|------|--|--|
| Date                | Phase                           | h m s        | Date  | Phase               | h m s        |      |  |  |
| Aug 7               | eLQ                             | 16 48 55     | Aug 9 | Continued           |              |      |  |  |
|                     | eLR (SW)                        | 16 51 35     |       | New Hebrides        |              |      |  |  |
| 7                   | eLQ                             | 17 11 25     |       | USCGS 16 02 36.1    |              |      |  |  |
|                     | eLR (SW)                        | 17 19 05     |       | 19.1°S 168.7°E      | Dist. 122.5° |      |  |  |
|                     | N. Balleny Islands              |              |       | Depth 69 km         |              |      |  |  |
| 7                   | eLQ                             | 17 54 05     | 9     | eLR (SE)            | 18 03 34     |      |  |  |
|                     | eLR                             | 18 01 35     |       | e                   | 19 53 52     |      |  |  |
|                     | Kermadec Islands                |              | 10    | eLR                 | 01 26 04     |      |  |  |
| 8                   | e                               | 00 30 15     |       |                     |              |      |  |  |
|                     | e                               | 00 33 05     | 10    | e                   | 01 29 54     |      |  |  |
| 8                   | ePS                             | 00 48 35     |       | eLR (NW)            | 01 33 34     |      |  |  |
|                     | eSS                             | 00 55 25     |       | Alaska Peninsula    |              |      |  |  |
|                     | eLQ                             | 01 08 45     |       | USCGS 00 58 38.9    |              |      |  |  |
|                     | eLR (SW)                        | 01 14 05     |       | 58.5°N 155.1°W      | Dist. 52.0°  |      |  |  |
|                     | Kermadec Islands                |              |       | Depth 68 km         |              |      |  |  |
|                     | USCGS 00 18 52.3                |              | 10    | eLQ                 | 02 11 34     |      |  |  |
|                     | 21.8°S 176.5°W                  | Dist. 113.7° |       | eLR (N)             | 02 15 04     |      |  |  |
|                     | Depth 51 km                     |              |       | Eastern USSR        |              |      |  |  |
| 8                   | eP                              | 05 47 05     |       | USCGS 01 34 19.5    |              |      |  |  |
|                     | ePP                             | 05 49 45     |       | 54.1°N 131.9°E      |              |      |  |  |
|                     | eS                              | 05 55 55     |       | Depth 25 km         |              |      |  |  |
|                     | eLQ                             | 06 03 25     | 10    | eLQ                 | 02 34 04     |      |  |  |
|                     | eLR                             | 06 08 55     |       | eLR                 | 02 39 44     |      |  |  |
|                     | Aleutians                       |              |       | Kermadec Islands    |              |      |  |  |
|                     | USCGS 05 36 28.9                |              | 10    | eLR                 | 08 26 04     |      |  |  |
|                     | 51.9°N 176.3°W                  | Dist. 69.3°  |       | Tonga Islands       |              |      |  |  |
|                     | Depth 57 km                     |              | 10    | ePKKS               | 12 36 44     |      |  |  |
| 8                   | eLQ                             | 08 11 35     |       | eLQ                 | 12 45 34     |      |  |  |
|                     | eLR (SW)                        | 08 17 05     |       | eLR                 | 12 48 34     |      |  |  |
|                     | W. of Easter Island             |              |       | Honshu, Japan       |              |      |  |  |
| 8                   | iP                              | 12 28 49     |       | USCGS 12 03 21.8    |              |      |  |  |
|                     | P (Z) 8 sec 4.5 mic dil from NW |              |       | 37.2°N 156.9°E      | Dist. 97.4°  |      |  |  |
|                     | ePP                             | 12 31 15     |       | Depth 51 km         |              |      |  |  |
|                     | ePPP                            | 12 32 53     | 10    | eLR                 | 18 19 03     |      |  |  |
|                     | eS                              | 12 37 21     |       | Solomon Island Reg. |              |      |  |  |
|                     | eSS                             | 12 42 01     |       |                     |              |      |  |  |
|                     | eSSS                            | 12 44 31     | 11    | eSS                 | 01 08 51     |      |  |  |
|                     | eLQ                             | 12 45 45     |       | eLQ                 | 01 13 03     |      |  |  |
|                     | eLR (NW)                        | 12 50 05     |       | eLR (N)             | 01 17 33     |      |  |  |
|                     | Fox Islands, Aleutians          |              |       | Kamchatka           |              |      |  |  |
|                     | USCGS 12 18 18.9                |              |       | USCGS 00 43 29.6    |              |      |  |  |
|                     | 50.9°N 170.7°W                  | Dist. 63.4°  |       | 56.1°N 164.3°E      | Dist. 71.6°  |      |  |  |
|                     | Depth 24 km                     | Mag 5¼ - 6   |       | Depth 27 km         |              |      |  |  |
|                     | * Z 9, E 15, N 11               |              |       |                     |              |      |  |  |
| 9                   | e                               | 02 40 54     | 11    | eL                  | 05 15 03     |      |  |  |
|                     | eLQ                             | 02 46 44     |       | Japan               |              |      |  |  |
|                     | eLR                             | 02 48 04     | 11    | eS                  | 06 34 19     |      |  |  |
| 9                   | eLQ                             | 03 20 04     |       | ePPS                | 06 35 53     |      |  |  |
|                     | eLR                             | 03 22 04     |       | eSS                 | 06 41 33     |      |  |  |
| 9                   | eLQ                             | 04 44 04     |       | eLQ                 | 06 55 03     |      |  |  |
|                     | eLR                             | 04 50 24     |       | eLR (NW)            | 06 57 23     |      |  |  |
|                     | Honshu, Japan                   |              |       | Japan               |              |      |  |  |
| 9                   | ePP                             | 16 23 04     |       | USCGS 06 08 18.2    |              |      |  |  |
|                     | ePS                             | 16 33 14     |       | 32.6°N 131.4°E      | Dist. 102.9° |      |  |  |
|                     | eLR (NW)                        | 16 59 04     |       | Depth 25 km         |              |      |  |  |
|                     | (continued)                     |              | 11    | ePS                 | 10 55 23     |      |  |  |
|                     |                                 |              |       | eSS                 | 11 03 11     |      |  |  |



| Palisades, New York |                                 |              | 26     |                      |              | 1961 |  |  |
|---------------------|---------------------------------|--------------|--------|----------------------|--------------|------|--|--|
| Date                | Phase                           | h m s        | Date   | Phase                | h m s        |      |  |  |
| Aug 11              | Continued                       |              | Aug 13 | Continued            |              |      |  |  |
|                     | eLQ                             | 11 16 15     |        | eLR                  | 04 27 01     |      |  |  |
|                     | eLR (NW)                        | 11 23 33     |        | Kermadec Islands     |              |      |  |  |
|                     | New Hebrides Islands            |              |        | USCGS 03 49 06.1     |              |      |  |  |
|                     | USCGS 10 24 55.9                |              |        | 27.4°S 178.5°W       | Dist. 118.1° |      |  |  |
|                     | 18.5°S 168.2°E                  | Dist. 121.9° |        | Depth 601 km         |              |      |  |  |
|                     | Depth 25 km                     |              |        |                      |              |      |  |  |
| 11                  | eLQ                             | 12 03 03     | 13     | eLQ                  | 06 52 41     |      |  |  |
|                     | eLR (E)                         | 12 10 03     |        | eLR (NE)             | 06 59 11     |      |  |  |
|                     | N. Celebes                      |              |        |                      |              |      |  |  |
| 11                  | iP                              | 16 04 26     | 14     | e                    | 11 53 31     |      |  |  |
|                     | P (Z) 6 sec 7 mic comp from NNW |              |        | eL                   | 12 03 31     |      |  |  |
|                     | epP                             | 16 04 39     |        |                      |              |      |  |  |
|                     | ePP                             | 16 07 52     | 14     | ePP                  | 19 10 23     |      |  |  |
|                     | ePPP                            | 16 09 18     |        | ePS                  | 19 20 01     |      |  |  |
|                     | eSKS                            | 16 14 50     |        | ePKKS                | 19 23 21     |      |  |  |
|                     | eS                              | 16 15 14     |        | eSKKS                | 19 27 31     |      |  |  |
|                     | ePPS                            | 16 16 10     |        | eLR                  | 19 44 11     |      |  |  |
|                     | eSS                             | 16 20 24     |        | Tonga Islands Region |              |      |  |  |
|                     | eSSS                            | 16 26 02     |        | USCGS 18 50 50.3     |              |      |  |  |
|                     | eLQ                             | 16 28 22     |        | 24.2°S 175.7°W       | Dist. 114.2° |      |  |  |
|                     | eLR                             | 16 32 12     |        | Depth 21 km          |              |      |  |  |
|                     | Hokkaido, Japan                 |              | 14     | eLQ                  | 22 53 01     |      |  |  |
|                     | USCGS 15 51 35.4                |              |        | eLR                  | 22 58 31     |      |  |  |
|                     | 42.9°N 145.1°E                  | Dist. 89.3°  |        | Japan                |              |      |  |  |
|                     | Depth 71 km                     | Mag. 6½      | 14     | ePP                  | 23 49 21     |      |  |  |
|                     | * Z 25, E 22, N 38              |              |        | ePKKP                | 23 57 41     |      |  |  |
| 11                  | e                               | 22 57 43     |        | New Hebrides         |              |      |  |  |
|                     | ePKS                            | 23 00 25     |        | USCGS 23 28 46.5     |              |      |  |  |
|                     | ePPP                            | 23 02 25     |        | 20.3°S 169.4°E       | Dist. 123.7° |      |  |  |
|                     | ePoSPKP                         | 23 08 09     |        | Depth 97 km          |              |      |  |  |
|                     | eSS                             | 23 18 01     | 15     | eLR                  | 00 27 31     |      |  |  |
|                     | e                               | 23 25 51     |        |                      |              |      |  |  |
|                     | eLQ                             | 23 37 31     | 15     | eLQ                  | 12 45 51     |      |  |  |
|                     | eLR (N)                         | 23 45 21     |        | eLR                  | 12 48 01     |      |  |  |
|                     | N. Celebes                      |              |        |                      |              |      |  |  |
|                     | USCGS 22 37 22.0                |              | 15     | eP                   | 19 17 37     |      |  |  |
|                     | 2.8°S 122.1°E                   | Dist. 139.5° |        | ePP                  | 19 21 39     |      |  |  |
|                     | Depth 20 km                     |              |        | e                    | 19 22 07     |      |  |  |
| 12                  | eLR                             | 03 00 21     |        | ePS                  | 19 30 43     |      |  |  |
|                     |                                 |              |        | eSS                  | 19 36 09     |      |  |  |
| 12                  | eLQ                             | 10 49 41     |        | eSSS                 | 19 41 01     |      |  |  |
|                     | eLR                             | 10 54 01     |        | eLQ                  | 19 48 01     |      |  |  |
|                     |                                 |              |        | eLR (NW)             | 19 52 41     |      |  |  |
| 12                  | eLQ                             | 15 46 31     |        | S. of Honshu, Japan  |              |      |  |  |
|                     | eLR                             | 15 51 01     |        | USCGS 19 03 55.7     |              |      |  |  |
|                     |                                 |              |        | 32.8°N 142.4°E       | Dist. 99.3°  |      |  |  |
|                     |                                 |              |        | Depth 39 km          |              |      |  |  |
| 12                  | eLR                             | 23 33 41     | 16     | eLR                  | 02 06 07     |      |  |  |
|                     | Solomon Islands Region          |              |        |                      |              |      |  |  |
| 13                  | eLR                             | 00 14 01     | 16     | eLR                  | 04 32 27     |      |  |  |
|                     |                                 |              |        | Kermadec Islands     |              |      |  |  |
| 13                  | ePKP                            | 02 51 01     | 16     | eLR                  | 09 47 37     |      |  |  |
|                     | Banda Sea                       |              |        | Japan                |              |      |  |  |
|                     | USCGS 02 32 58.3                |              |        |                      |              |      |  |  |
|                     | 5.6°S 130.3°E                   | Dist. 139.1° | 16     | e                    | 11 03 59     |      |  |  |
|                     | Depth 39 km                     |              |        | eLQ                  | 11 15 27     |      |  |  |
| 13                  | eLR                             | 03 26 31     |        | eLR                  | 11 20 47     |      |  |  |
|                     |                                 |              |        |                      |              |      |  |  |
| 13                  | ePS                             | 04 18 05     |        |                      |              |      |  |  |
|                     | eLQ                             | 04 21 01     |        |                      |              |      |  |  |
|                     | (continued)                     |              |        |                      |              |      |  |  |

| Palisades, New York |                           |              | 27     |   |              | 1961 |  |  |
|---------------------|---------------------------|--------------|--------|---|--------------|------|--|--|
| Date                | Phase                     | h m s        | Date   | Phase   | h m s        |      |  |  |
| Aug 16              | eP                        | 16 27 34     | Aug 18 | eLR   | 11 16 08     |      |  |  |
|                     | eS                        | 16 37 46     |        | Kermadec  |              |      |  |  |
|                     | ePS                       | 16 38 26     | 19     | eS  | 03 06 36     |      |  |  |
|                     | ePPS                      | 16 39 06     |        | eSS   | 03 13 08     |      |  |  |
|                     | eSS                       | 16 42 52     |        | eLQ   | 03 22 38     |      |  |  |
|                     | eLQ                       | 16 48 14     |        | eLR   | 03 26 20     |      |  |  |
|                     | eLR (SE)                  | 16 51 32     |        | Japan. E. Hokkaido                                  |              |      |  |  |
|                     | S. of Ascension Islands   |              |        | USCGS 02 42 58.2                                    |              |      |  |  |
|                     | USCGS 16 15 57.5          |              |        | 43.1°N 145.0°E                                      | Dist. 89.3°  |      |  |  |
|                     | 13.8°S 14.7°W             | Dist. 77.2°  |        | Depth 32 km   |              |      |  |  |
|                     | Depth 25 km               |              | 19     | iP (dil from S)                                     | 05 18 02     |      |  |  |
| 16                  | eLR                       | 23 24 06     |        | iPcP  | 05 19 03     |      |  |  |
|                     | Philippines               |              |        | iP  | 05 19 47     |      |  |  |
| 17                  | eLR                       | 02 06 46     |        | esP   | 05 20 57     |      |  |  |
|                     | Kermadec Islands          |              |        | ePcS  | 05 22 09     |      |  |  |
|                     |                           |              |        | eS  | 05 24 31     |      |  |  |
| 17                  | eSS                       | 05 39 26     |        | eScS  | 05 26 45     |      |  |  |
|                     | ePcPPKP                   | 05 40 06     |        | eSS   | 05 27 59     |      |  |  |
|                     | eLQ                       | 05 50 46     |        | esScS   | 05 31 09     |      |  |  |
|                     | eLR (SSW)                 | 05 56 46     |        | Peru-Brazil Border                                  |              |      |  |  |
|                     | Antartic Ocean            |              |        | USCGS 05 09 49.5                                    |              |      |  |  |
|                     | USCGS 05 06 03.5          |              |        | 10.7°S 71.0°W                                       | Dist. 51.82° |      |  |  |
|                     | 55.3°S 124.3°W            | Dist. 104.7° |        | Depth 649 km  |              |      |  |  |
|                     | Depth 62 km               |              | 19     | i   | 05 25 51     |      |  |  |
| 17                  | eSKS                      | 06 59 10     | 19     | eLQ   | 06 16 29     |      |  |  |
|                     | ePS                       | 06 59 50     |        | eLR   | 06 21 09     |      |  |  |
|                     | eSS                       | 07 04 06     |        | Honshu, Japan                                       |              |      |  |  |
|                     | eLQ                       | 07 11 06     |        |   |              |      |  |  |
|                     | eLR (SSW)                 | 07 16 06     | 19     | eP  | 14 57 29     |      |  |  |
|                     | S. of Easter Island       |              |        | P (Z) 8 sec 2 mic dil from S                        |              |      |  |  |
|                     | USCGS 06 36 23.0          |              |        | iP  | 14 57 30     |      |  |  |
|                     | 34.4°S 109.0°W            | Dist. 81.3°  |        | ePP   | 14 57 49     |      |  |  |
|                     | Depth 25 km               |              |        | ePPP  | 14 58 03     |      |  |  |
| 17                  | eS                        | 18 07 48     |        | eS  | 15 01 40     |      |  |  |
|                     | eLQ                       | 18 13 38     |        | e   | 15 01 45     |      |  |  |
|                     | eLR                       | 18 20 16     |        | e   | 15 02 09     |      |  |  |
|                     | Near Coast S. Peru        |              |        | eLQ   | 15 02 21     |      |  |  |
|                     | USCGS 17 49 47.5          |              |        | eLR   | 15 03 29     |      |  |  |
|                     | 17.1°S 71.8°W             | Dist. 57.7°  |        | T   | 15 18 43     |      |  |  |
|                     | Depth 105 km              |              |        | Mona Passage  |              |      |  |  |
| 17                  | iP                        | 21 28 50     |        | USCGS 14 52 31.4                                    |              |      |  |  |
|                     | P (Z) 5 sec 3 mic dil NNW |              |        | 18.0°N 68.8°W                                       | Dist. 23.3°  |      |  |  |
|                     | epP                       | 21 29 30     |        | Depth 146 km (not more than 60 km for t. t. curves) |              |      |  |  |
|                     | ePP                       | 21 30 42     | 19     | eLQ   | 20 45 39     |      |  |  |
|                     | ePPP                      | 21 32 38     |        | eLR   | 20 51 43     |      |  |  |
|                     | iS                        | 21 38 56     |        |   |              |      |  |  |
|                     | ePS                       | 21 39 56     | 19     | eSS   | 21 06 29     |      |  |  |
|                     | ePPS                      | 21 40 08     |        | eSSS  | 21 12 09     |      |  |  |
|                     | eSS                       | 21 44 16     |        | eLQ   | 21 28 09     |      |  |  |
|                     | eSSS                      | 21 48 04     |        | eLR (N)   | 21 34 09     |      |  |  |
|                     | e                         | 21 51 32     |        | W. Coast Sumatra                                    |              |      |  |  |
|                     | eLQ                       | 21 52 48     |        | USCGS 20 26 18.0                                    |              |      |  |  |
|                     | eLR (N)                   | 21 56 48     |        | 2.1°N 96.9°E  | Dist. 136.4° |      |  |  |
|                     | Kurile Islands            |              |        | Depth 25 km   |              |      |  |  |
|                     | USCGS 21 16 30.0          |              | 20     | eLQ   | 00 39 45     |      |  |  |
|                     | 46.3°N 149.3°E            | Dist. 85.2°  |        | eLR   | 00 40 29     |      |  |  |
|                     | Depth 186 km              | Mag 5½-5¾    |        | Peru-Brazil Border                                  |              |      |  |  |
|                     | Z 5, E 5, N 6             |              |        | Depth 659 km  |              |      |  |  |
| 18                  | eLR                       | 05 40 48     | 20     | ePP   | 01 50 49     |      |  |  |
|                     |                           |              |        | ePKKS   | 02 03 19     |      |  |  |
| 18                  | eLR                       | 07 14 20     |        | eSS   | 02 08 29     |      |  |  |
|                     |                           |              |        | (continued)   |              |      |  |  |



| Palisades, New York |                    |    |    | 28 |        |                           |    | 1961 |    |  |  |
|---------------------|--------------------|----|----|----|--------|---------------------------|----|------|----|--|--|
| Date                | Phase              | h  | m  | s  | Date   | Phase                     | h  | m    | s  |  |  |
| Aug 20              | eLQ                | 02 | 21 | 49 | Aug 22 | Continued                 |    |      |    |  |  |
| (cont't)            | eLR (NW)           | 02 | 28 | 09 |        | eLR (NW)                  | 09 | 57   | 53 |  |  |
|                     | New Hebrides       |    |    |    |        | New Hebrides              |    |      |    |  |  |
|                     | USCGS 01 30 19.2   |    |    |    |        | USCGS 08 59 27.9          |    |      |    |  |  |
|                     | 17.8°S 169.0°E     |    |    |    |        | 13.4°S 166.7°E            |    |      |    |  |  |
|                     | Depth 36 km        |    |    |    |        | Depth 63 km               |    |      |    |  |  |
| 20                  | eLR                | 03 | 28 | 09 | 22     | eLR                       | 18 | 33   | 45 |  |  |
|                     | New Hebrides       |    |    |    |        |                           |    |      |    |  |  |
| 20                  | eP                 | 05 | 17 | 59 | 22     | eLR                       | 23 | 36   | 05 |  |  |
|                     | ePP                | 05 | 19 | 51 |        | Aleutians                 |    |      |    |  |  |
|                     | ePP                | 05 | 22 | 45 | 23     | e                         | 01 | 13   | 23 |  |  |
|                     | eS                 | 05 | 29 | 39 |        | eLQ                       | 01 | 17   | 15 |  |  |
|                     | ePS                | 05 | 31 | 49 |        | eLR (WNW)                 | 01 | 18   | 15 |  |  |
|                     | eSS                | 05 | 40 | 53 |        | San Diego Co., California |    |      |    |  |  |
|                     | eSSS (NW)          | 05 | 44 | 49 |        | USCGS 01 00 47.1          |    |      |    |  |  |
|                     | Fiji Islands       |    |    |    |        | 32.9°N 116.3°W            |    |      |    |  |  |
|                     | USCGS 05 04 14.3   |    |    |    |        | Depth 27 km               |    |      |    |  |  |
|                     | 17.8°S 178.8°W     |    |    |    |        | Dist. 34.3°               |    |      |    |  |  |
|                     | Depth 592 km       |    |    |    | 23     | eP                        | 04 | 25   | 55 |  |  |
| 20                  | eLR                | 09 | 45 | 09 |        | ePP                       | 04 | 29   | 41 |  |  |
|                     | Peru-Brazil Border |    |    |    |        | ePS                       | 04 | 38   | 25 |  |  |
|                     | Depth 678 km       |    |    |    |        | eSS                       | 04 | 44   | 15 |  |  |
|                     |                    |    |    |    |        | eSSS                      | 04 | 48   | 15 |  |  |
| 20                  | eLR                | 11 | 18 | 39 |        | eLR (NE)                  | 04 | 58   | 15 |  |  |
|                     | Solomon Islands    |    |    |    |        | Tadzhik, USSR             |    |      |    |  |  |
|                     |                    |    |    |    |        | USCGS 04 12 35.9          |    |      |    |  |  |
| 20                  | e                  | 13 | 06 | 33 |        | 38.7°N 68.7°E             |    |      |    |  |  |
|                     | e                  | 13 | 10 | 29 |        | Depth 25 km               |    |      |    |  |  |
|                     | eLQ                | 13 | 12 | 29 | 23     | eLQ                       | 07 | 28   | 15 |  |  |
|                     | eLR                | 13 | 14 | 09 |        | eLR                       | 07 | 30   | 15 |  |  |
| 20                  | eLR                | 15 | 31 | 30 | 23     | eLR                       | 15 | 41   | 15 |  |  |
|                     |                    |    |    |    |        | Philippines               |    |      |    |  |  |
| 20                  | eLR                | 18 | 56 | 10 | 23     | eLR                       | 17 | 19   | 55 |  |  |
| 20                  | eLQ                | 21 | 10 | 10 | 23     | e                         | 19 | 34   | 43 |  |  |
|                     | eLR                | 21 | 12 | 50 |        | e                         | 19 | 39   | 25 |  |  |
| 21                  | eLQ                | 08 | 14 | 10 |        | eLR                       | 19 | 43   | 15 |  |  |
|                     | eLR                | 08 | 18 | 30 | 23     | eLQ                       | 23 | 45   | 25 |  |  |
| 21                  | eSKS               | 16 | 32 | 29 |        | eLR                       | 23 | 51   | 15 |  |  |
|                     | ePS                | 16 | 35 | 33 | 24     | eSS                       | 05 | 23   | 15 |  |  |
|                     | eSS                | 16 | 41 | 13 |        | eLQ                       | 05 | 31   | 15 |  |  |
|                     | eSSS               | 16 | 45 | 33 |        | eLR                       | 05 | 35   | 55 |  |  |
|                     | eLQ                | 16 | 51 | 13 |        | Hokkaido, Japan           |    |      |    |  |  |
|                     | eLR (W)            | 16 | 58 | 13 |        | USCGS 04 52 20.5          |    |      |    |  |  |
|                     | Tonga Islands      |    |    |    |        | 42.9°N 145.3°E            |    |      |    |  |  |
|                     | USCGS 16 06 55.4   |    |    |    |        | Depth 44 km               |    |      |    |  |  |
|                     | 17.8°S 174.4°W     |    |    |    |        | Dist. 89.3°               |    |      |    |  |  |
|                     | Depth 74 km        |    |    |    | 24     | eLQ                       | 10 | 03   | 15 |  |  |
| 21                  | eL                 | 19 | 28 | 43 |        | eLR                       | 10 | 09   | 35 |  |  |
|                     |                    |    |    |    |        | New Hebrides              |    |      |    |  |  |
| 21                  | eL                 | 19 | 51 | 43 | 24     | eLQ                       | 18 | 19   | 18 |  |  |
| 22                  | eLQ                | 00 | 23 | 33 |        | eLR                       | 18 | 25   | 36 |  |  |
|                     | eLR                | 00 | 24 | 53 |        | New Britain               |    |      |    |  |  |
| 22                  | ePS                | 09 | 29 | 37 | 24     | e                         | 20 | 56   | 10 |  |  |
|                     | eSS                | 09 | 36 | 29 |        | e                         | 21 | 01   | 36 |  |  |
|                     | e                  | 09 | 36 | 53 |        | e                         | 21 | 28   | 16 |  |  |
|                     | eLQ                | 09 | 50 | 13 |        | e                         | 21 | 38   | 16 |  |  |
|                     | (continued)        |    |    |    |        | (continued)               |    |      |    |  |  |

| Palisades, New York |                   |    |    | 29 |        |                        |    | 1961 |    |  |  |
|---------------------|-------------------|----|----|----|--------|------------------------|----|------|----|--|--|
| Date                | Phase             | h  | m  | s  | Date   | Phase                  | h  | m    | s  |  |  |
| Aug 24              | Continued         |    |    |    | Aug 27 | Continued              |    |      |    |  |  |
|                     | eLQ               | 21 | 48 | 16 |        | Easter Island Region   |    |      |    |  |  |
|                     | eLR               | 21 | 54 | 36 |        | USCGS 15 28 25.0       |    |      |    |  |  |
|                     | New Britain       |    |    |    |        | 22.8°S 114.4°W         |    |      |    |  |  |
|                     |                   |    |    |    |        | Depth 25 km            |    |      |    |  |  |
| 24                  | eLR               | 22 | 52 | 06 | 27     | eP                     | 16 | 34   | 34 |  |  |
| 24                  | eLQ               | 23 | 22 | 26 |        | ipP                    | 16 | 34   | 43 |  |  |
|                     | eLR               | 23 | 28 | 36 |        | ePP                    | 16 | 38   | 01 |  |  |
|                     | Japan             |    |    |    |        | ePPP                   | 16 | 39   | 59 |  |  |
| 25                  | eLR               | 00 | 58 | 56 |        | eS                     | 16 | 44   | 45 |  |  |
|                     |                   |    |    |    |        | eSS                    | 16 | 50   | 43 |  |  |
| 25                  | eS                | 05 | 52 | 42 |        | eSSS                   | 16 | 54   | 29 |  |  |
|                     | eLQ               | 05 | 52 | 56 |        | eLQ                    | 17 | 00   | 19 |  |  |
|                     | eLR               | 05 | 54 | 16 |        | eLR (NW)               | 17 | 04   | 39 |  |  |
|                     | N. Honduras       |    |    |    |        | Kurile Islands         |    |      |    |  |  |
|                     | USCGS 05 42 01.2  |    |    |    |        | USCGS 16 22 08.1       |    |      |    |  |  |
|                     | 15.2°N 87.0°W     |    |    |    |        | 46.6°N 154.1°E         |    |      |    |  |  |
|                     | Depth 48 km       |    |    |    |        | Depth 31 km            |    |      |    |  |  |
|                     |                   |    |    |    |        | Z 4.6, E 2, N 3        |    |      |    |  |  |
| 25                  | eLR               | 06 | 52 | 16 | 27     | eLR (NW)               | 17 | 41   | 31 |  |  |
|                     | Admiralty Islands |    |    |    |        | Marianas               |    |      |    |  |  |
|                     |                   |    |    |    |        | Z 6, E 2, N 2          |    |      |    |  |  |
| 25                  | eLR               | 07 | 28 | 16 |        |                        |    |      |    |  |  |
|                     | Alaska Peninsula  |    |    |    |        | Mag 5/4-5/4            |    |      |    |  |  |
| 26                  | eLR (SW)          | 04 | 42 | 17 | 27     | e                      | 21 | 26   | 40 |  |  |
| 26                  | e                 | 07 | 03 | 51 |        | eLQ                    | 21 | 35   | 20 |  |  |
|                     | e                 | 07 | 04 | 17 |        | eLR                    | 21 | 39   | 50 |  |  |
|                     | eLQ               | 07 | 07 | 01 |        | Kurile Islands         |    |      |    |  |  |
|                     | eLR (SW)          | 07 | 09 | 17 | 27     | eS                     | 22 | 29   | 32 |  |  |
| 26                  | e                 | 18 | 58 | 17 |        | eLQ                    | 22 | 37   | 32 |  |  |
|                     | eLR (NW)          | 19 | 01 | 17 |        | eLR (E)                | 22 | 43   | 20 |  |  |
|                     | New Hebrides      |    |    |    |        | Near W. coast of Crete |    |      |    |  |  |
|                     |                   |    |    |    |        | USCGS 22 08 49.8       |    |      |    |  |  |
|                     |                   |    |    |    |        | 35.9°N 23.7°E          |    |      |    |  |  |
|                     |                   |    |    |    |        | Depth 69 km            |    |      |    |  |  |
| 26                  | eLR (NW)          | 19 | 38 | 47 | 28     | eLR                    | 00 | 16   | 50 |  |  |
|                     | Marianas          |    |    |    |        |                        |    |      |    |  |  |
| 27                  | e                 | 01 | 11 | 18 | 28     | e                      | 03 | 33   | 48 |  |  |
|                     | eLR (W)           | 01 | 13 | 38 |        | eLQ                    | 03 | 43   | 00 |  |  |
|                     |                   |    |    |    |        | eLR                    | 03 | 45   | 40 |  |  |
| 27                  | eP                | 02 | 03 | 56 | 28     | eP                     | 06 | 37   | 44 |  |  |
|                     | ePP               | 02 | 06 | 58 |        | eS                     | 06 | 45   | 16 |  |  |
|                     | eS                | 02 | 14 | 00 |        | ePPS                   | 06 | 46   | 42 |  |  |
|                     | ePPS              | 02 | 15 | 16 |        | eScS                   | 06 | 47   | 14 |  |  |
|                     | eSS               | 02 | 19 | 10 |        | eSS                    | 06 | 49   | 20 |  |  |
|                     | eSSS              | 02 | 22 | 48 |        | eLQ                    | 06 | 52   | 20 |  |  |
|                     | eLQ               | 02 | 24 | 58 |        | eLR (SE)               | 06 | 55   | 00 |  |  |
|                     | eLR               | 02 | 28 | 18 |        | Peru-Bolivia Border    |    |      |    |  |  |
|                     | Z 4, E 1, N 1.5   |    |    |    |        | USCGS 06 28 19.4       |    |      |    |  |  |
| 27                  | eLR               | 03 | 27 | 08 |        | 15.1°S 70.2°W          |    |      |    |  |  |
|                     |                   |    |    |    |        | Depth 185 km           |    |      |    |  |  |
| 27                  | eLR               | 07 | 29 | 49 | 28     | eLQ                    | 09 | 45   | 40 |  |  |
|                     | Fiji Islands      |    |    |    |        | eLR                    | 09 | 50   | 40 |  |  |
| 27                  | e                 | 12 | 24 | 59 |        |                        |    |      |    |  |  |
|                     | eLQ               | 12 | 30 | 49 |        | Kamchatka              |    |      |    |  |  |
|                     | eLR               | 12 | 35 | 27 | 28     | eLQ                    | 10 | 34   | 20 |  |  |
| 27                  | eS                | 15 | 49 | 31 |        | eLR                    | 10 | 37   | 40 |  |  |
|                     | eLQ               | 15 | 58 | 19 |        | Fiji                   |    |      |    |  |  |
|                     | eLR               | 16 | 03 | 19 |        |                        |    |      |    |  |  |
|                     | (continued)       |    |    |    |        | (continued)            |    |      |    |  |  |

| Palisades, New York |                        |    |    | 30          |        | 1961               |    |    |             |
|---------------------|------------------------|----|----|-------------|--------|--------------------|----|----|-------------|
| Date                | Phase                  | h  | m  | s           | Date   | Phase              | h  | m  | s           |
| Aug 28              | eLQ                    | 12 | 59 | 20          | Aug 30 | eP                 | 03 | 43 | 53          |
|                     | eLR                    | 13 | 05 | 10          |        | ePP                | 03 | 46 | 01          |
|                     | Kurile Islands         |    |    |             |        | ePcS               | 03 | 49 | 21          |
|                     |                        |    |    |             |        | eS                 | 03 | 50 | 59          |
| 28                  | eLR                    | 16 | 28 | 50          |        | eSS                | 03 | 53 | 41          |
|                     |                        |    |    |             |        | eLQ                | 03 | 54 | 51          |
| 28                  | eLR                    | 18 | 04 | 40          |        | eLR (E)            | 03 | 56 | 21          |
|                     |                        |    |    |             |        | N. Atlantic Ocean  |    |    |             |
| 28                  | eLR                    | 18 | 44 | 20          |        | USCGS 03 35 07.7   |    |    |             |
|                     | Kurile Islands         |    |    |             |        | 7.0°N 33.2°W       |    |    | Dist. 49.7° |
|                     |                        |    |    |             |        | Depth 69 km        |    |    | Mag 4½-4¾   |
| 28                  | eP                     | 20 | 37 | 32          |        | Z 3, E 1.5, N 1.5  |    |    |             |
|                     | ePPP                   | 20 | 42 | 10          |        |                    |    |    |             |
|                     | eS                     | 20 | 47 | 06          | 30     | e                  | 16 | 19 | 23          |
|                     | eScS                   | 20 | 47 | 35          |        | e                  | 16 | 19 | 38          |
|                     | eSS                    | 20 | 51 | 30          |        | e                  | 16 | 20 | 10          |
|                     | eSSS                   | 20 | 55 | 20          |        |                    |    |    |             |
|                     | eLQ                    | 20 | 57 | 20          | 30     | e                  | 19 | 53 | 15          |
|                     | eLR (W)                | 20 | 59 | 40          |        |                    |    |    |             |
|                     | Easter Island region   |    |    |             | 30     | e                  | 23 | 24 | 16          |
|                     | USCGS 20 26 04.2       |    |    |             |        | e                  | 23 | 24 | 34          |
|                     | 22.9°S 113.4°W         |    |    | Dist. 73.3° |        |                    |    |    |             |
|                     | Depth 56 km            |    |    |             | 31     | eLR                | 01 | 19 | 22          |
| 28                  | eP                     | 21 | 36 | 38          | 31     | iP (dil from S)    | 01 | 56 | 50          |
|                     | ePcP                   | 21 | 37 | 04          |        | epP                | 01 | 57 | 55          |
|                     | eS                     | 21 | 44 | 15          |        | esP                | 01 | 58 | 39          |
|                     | eSS                    | 21 | 48 | 04          |        | ePPP               | 01 | 59 | 40          |
|                     | eSSS                   | 21 | 48 | 48          |        | esPP               | 02 | 00 | 03          |
|                     | eLQ                    | 21 | 50 | 20          |        | esPPP              | 02 | 00 | 44          |
|                     | eLR (SE)               | 21 | 53 | 20          |        | eScP               | 02 | 01 | 33          |
|                     | Near coast Peru        |    |    |             |        | eS                 | 02 | 03 | 26          |
|                     | USCGS 21 27 12.1       |    |    |             |        | esScP              | 02 | 03 | 58          |
|                     | 14.0°S 74.4°W          |    |    | Dist. 54.7° |        | esPS               | 02 | 05 | 34          |
|                     | Depth 73 km            |    |    |             |        | eSS                | 02 | 06 | 25          |
| 29                  | eLQ                    | 02 | 55 | 20          |        | eLR                | 02 | 11 | 22          |
|                     | eLR                    | 03 | 00 | 20          |        | Peru-Brazil border |    |    |             |
|                     |                        |    |    |             |        | USCGS 01 48 37.5   |    |    |             |
| 29                  | eLQ                    | 06 | 35 | 20          |        | 10.6°S 70.9°W      |    |    | Dist. 51.8° |
|                     | eLR                    | 06 | 39 | 50          |        | Depth 626 km       |    |    |             |
|                     | Kurile Islands         |    |    |             | 31     | iP (dil from S)    | 02 | 05 | 16          |
| 29                  | e                      | 11 | 02 | 20          |        | ipP                | 02 | 06 | 15          |
|                     | Banda Sea              |    |    |             |        | esP                | 02 | 06 | 42          |
|                     |                        |    |    |             |        | iS                 | 02 | 11 | 46          |
| 29                  | eLQ                    | 12 | 28 | 40          |        | eSS                | 02 | 15 | 06          |
|                     | eLR                    | 12 | 32 | 00          |        | eLQ                | 02 | 17 | 22          |
|                     | Argentina              |    |    |             |        | eLR                | 02 | 18 | 52          |
|                     |                        |    |    |             |        | Peru-Brazil border |    |    |             |
| 29                  | eP                     | 15 | 01 | 37          |        | USCGS 01 57 08.0   |    |    | Dist. 51.8° |
|                     | ePcP                   | 15 | 01 | 55          |        | 10.4°S 70.7°W      |    |    |             |
|                     | ePP                    | 15 | 04 | 01          |        | Depth 629 km       |    |    |             |
|                     | ePPP                   | 15 | 05 | 29          | 31     | eLR                | 23 | 42 | 42          |
|                     | eS                     | 15 | 10 | 07          |        | W. New Guinea      |    |    |             |
|                     | ePS                    | 15 | 10 | 17          |        |                    |    |    |             |
|                     | eScS                   | 15 | 11 | 29          |        |                    |    |    |             |
|                     | eSS                    | 15 | 14 | 41          |        |                    |    |    |             |
|                     | eLQ                    | 15 | 17 | 41          |        |                    |    |    |             |
|                     | eLR (NW)               | 15 | 21 | 41          |        |                    |    |    |             |
|                     | Fox Islands, Aleutians |    |    |             |        |                    |    |    |             |
|                     | USCGS 14 51 14.2       |    |    |             |        |                    |    |    |             |
|                     | 52.2°N 170.8°W         |    |    | Dist. 62.9° |        |                    |    |    |             |
|                     | Depth 41 km            |    |    | Mag 5-5½    |        |                    |    |    |             |
|                     | Z 6, E 2, N 4          |    |    |             |        |                    |    |    |             |
| 29                  | eLR                    | 17 | 09 | 21          |        |                    |    |    |             |

**LAMONT GEOLOGICAL OBSERVATORY  
COLUMBIA UNIVERSITY  
PALISADES, NEW YORK**



**SEISMOLOGICAL BULLETIN**

**By**

**RUTH B. SIMON**



**1 September 1961 - 31 December 1961**

**L.G.O. Contribution No. 540**



## STATION CONSTANTS

Latitude: 41° 00' 25" North  
 Longitude: 73° 54' 31" West  
 Elevation: 102.59 meters  
 Bedrock: Palisades disbase Triassic Age

## Abbreviations

i = sudden beginning of the motion (impetus)  
 e = gradual beginning of the motion (emersio)  
 Lg = short-period continental surface shear wave  
 Rg = continental Rayleigh wave  
 Comp. = compression  
 Dil. = dilatation

All times are G. C. T.

Time - I. B. M. Invar pendulum clock corrected by Naval  
 Observatory time signals every six hours.

## INSTRUMENTS

Three component Columbia University seismographs,  
 To = 12 sec., Tg = 15 sec.

Three component Benioff seismographs. Short-period, To =  
 1 sec., Tg = 0.2 sec. Long-period, To = 1 sec., Tg = 75 sec.

One Columbia University vertical seismograph, To = .33 sec.,  
 Tg = 0.2 sec.

Three component Columbia University visual recording  
 seismographs, To = 12 sec.

One Columbia University vertical seismograph for visual  
 recording, To = 1 sec.

Three component Columbia University long-period seismographs,  
 To = 15 sec., Tg = 75 sec.

Three component Columbia University long-period  
 seismographs, To = 30 sec., Tg = 100 sec.

Three component Columbia University long-period  
 seismographs, To = 30 sec., Tg = 100 sec. P<sub>2</sub>

Two Columbia University microbarographs, To = 10 sec.,  
 Tg = 75 sec.

| Palisades, New York |                        |              |    | 1961 |        |                         |                     |    |    |    |
|---------------------|------------------------|--------------|----|------|--------|-------------------------|---------------------|----|----|----|
| Date                | Phase                  | h            | m  | s    | Date   | Phase                   | h                   | m  | s  |    |
| Sept 1              | eP (comp from S)       | 00           | 23 | 45   | Sept 2 | Continued               |                     |    |    |    |
|                     | e(PKP)                 | 00           | 26 | 56   |        | eLQ                     | 11                  | 48 | 22 |    |
|                     | ePP                    | 00           | 28 | 12   |        | eLR (NE)                | 11                  | 52 | 52 |    |
|                     | ePPP                   | 00           | 30 | 34   |        | W. of Maldives Islands, |                     |    |    |    |
|                     | ePKS                   | 00           | 31 | 22   |        | Indian Ocean            |                     |    |    |    |
|                     | eSKS                   | 00           | 34 | 04   |        | USCGS 10 50 36.7        |                     |    |    |    |
|                     | eSKKS                  | 00           | 34 | 52   |        | 2.0°S 67.5°E            | Dist. 128.2°        |    |    |    |
|                     | ePS                    | 00           | 37 | 28   |        | Depth 132 km            |                     |    |    |    |
|                     | ePPS                   | 00           | 38 | 16   |        |                         |                     |    |    |    |
|                     | eSS                    | 00           | 43 | 22   | 2      | eLR                     | 12                  | 40 | 52 |    |
|                     | eLQ                    | 00           | 54 | 02   |        |                         |                     |    |    |    |
|                     | eLR                    | 00           | 58 | 52   | 2      | eLQ                     | 14                  | 47 | 22 |    |
|                     | S. Sandwich Islands    |              |    |      |        | eLR                     | 14                  | 51 | 52 |    |
|                     | USCGS 00 09 34.6       |              |    |      |        | Near coast Greece       |                     |    |    |    |
|                     | 59.3°S 27.3°W          | Dist. 106.9° |    |      |        | USCGS 14 16 08.6        |                     |    |    |    |
|                     | Depth 131 km           | Mag. 6¼-6½   |    |      |        | 38.9°N 23.6°E           | Dist. 70.8°         |    |    |    |
|                     | Z 16, E 15, N 32       |              |    |      |        | Depth 20 km             |                     |    |    |    |
| 1                   | eP                     | 18           | 56 | 56   | 2      | eLR                     | 19                  | 09 | 42 |    |
|                     | ePP                    | 18           | 57 | 50   |        |                         |                     |    |    |    |
|                     | ePcP                   | 18           | 59 | 38   | 2      | eL                      | 23                  | 31 | 52 |    |
|                     | eS                     | 19           | 01 | 58   |        |                         |                     |    |    |    |
|                     | e                      | 19           | 02 | 34   | 3      | eP                      | 04                  | 54 | 32 |    |
|                     | eSS                    | 19           | 04 | 02   |        | epP                     | 04                  | 54 | 46 |    |
|                     | eLR (SSW)              | 19           | 05 | 52   |        | eS                      | 04                  | 59 | 28 |    |
|                     | Off coast Guatemala    |              |    |      |        | esS                     | 04                  | 59 | 58 |    |
|                     | USCGS 18 50 35.4       |              |    |      |        | ePcS                    | 05                  | 01 | 30 |    |
|                     | 13.5°N 92.5°W          | Dist. 31.7°  |    |      |        | eLR (SW)                | 05                  | 02 | 52 |    |
|                     | Depth 37 km            | Mag. 5½-5¾   |    |      |        | Near coast Nicaragua    |                     |    |    |    |
|                     | * Z 26, E 19, N 27     |              |    |      |        | USCGS 04 48 25.6        | Dist. 31.1°         |    |    |    |
|                     |                        |              |    |      |        | 12.1°N 86.9°W           |                     |    |    |    |
|                     |                        |              |    |      |        | Depth 124 km            |                     |    |    |    |
| 2                   | eP                     | 00           | 36 | 32   | 3      | eLR                     | 07                  | 11 | 32 |    |
|                     | ePP                    | 00           | 38 | 48   |        |                         |                     |    |    |    |
|                     | ePcS                   | 00           | 41 | 22   | 3      | eLR                     | 12                  | 54 | 52 |    |
|                     | eS                     | 00           | 45 | 00   |        |                         |                     |    |    |    |
|                     | eSS                    | 00           | 50 | 02   | 3      | eLR                     | 18                  | 57 | 42 |    |
|                     | eLQ                    | 00           | 53 | 52   |        |                         |                     |    |    |    |
|                     | eLR (NW)               | 00           | 57 | 22   | 3      | eLR                     | 20                  | 50 | 02 |    |
|                     | eLR <sub>2</sub>       | 01           | 06 | 52   |        |                         |                     |    |    |    |
|                     | Fox Islands, Aleutians |              |    |      |        |                         |                     |    |    |    |
|                     | USCGS 00 26 06.2       |              |    |      |        | 3                       | e                   | 23 | 19 | 22 |
|                     | 52.0°N 170.9°W         | Dist. 62.8°  |    |      |        |                         | eLR (SW)            | 23 | 22 | 22 |
|                     | Depth 39 km            |              |    |      |        |                         |                     |    |    |    |
|                     | Z 3, E 1.5, N 2.5      |              |    |      |        |                         |                     |    |    |    |
|                     |                        |              |    |      |        |                         |                     |    |    |    |
| 2                   | eSS                    | 04           | 29 | 22   | 4      | eLQ                     | 01                  | 22 | 22 |    |
|                     | eSSS                   | 04           | 34 | 22   |        | eLR (N)                 | 01                  | 28 | 52 |    |
|                     | eLQ                    | 04           | 47 | 32   |        | Aleutians               |                     |    |    |    |
|                     | eLR (SW)               | 04           | 58 | 42   | 4      | e                       | 02                  | 14 | 52 |    |
|                     | Macquarie Islands      |              |    |      |        | eLR (SW)                | 02                  | 17 | 22 |    |
|                     | USCGS 03 46 36.8       |              |    |      |        |                         |                     |    |    |    |
|                     | 56.6°S 147.1°E         | Dist. 149.3° |    |      |        | 4                       | e                   | 04 | 48 | 02 |
|                     | Depth 41 km            |              |    |      |        |                         | eLR (NW)            | 04 | 59 | 22 |
|                     |                        |              |    |      |        |                         | S. of Honshu, Japan |    |    |    |
| 2                   | eLR                    | 07           | 16 | 02   | 4      | eP                      | 10                  | 00 | 01 |    |
|                     | Kermadec               |              |    |      |        | iP                      | 10                  | 00 | 02 |    |
|                     |                        |              |    |      |        | iPcP                    | 10                  | 00 | 31 |    |
| 2                   | e                      | 10           | 20 | 42   |        | ePP                     | 10                  | 02 | 30 |    |
|                     | eLQ                    | 10           | 32 | 52   |        | ePPP                    | 10                  | 04 | 26 |    |
|                     | eLR                    | 10           | 35 | 22   |        | eS                      | 10                  | 08 | 50 |    |
|                     |                        |              |    |      |        | eScS                    | 10                  | 09 | 08 |    |
| 2                   | eSS                    | 11           | 28 | 48   |        | ePS                     | 10                  | 09 | 52 |    |
|                     | e(SKSSKS)              | 11           | 32 | 10   |        | ePPS                    | 10                  | 10 | 14 |    |
|                     | eSSS                   | 11           | 34 | 22   |        | eSS                     | 10                  | 14 | 02 |    |
|                     | eSSSS                  | 11           | 40 | 22   |        | eSSS                    | 10                  | 16 | 34 |    |
|                     | (continued)            |              |    |      |        | (continued)             |                     |    |    |    |





| Palisades, New York |                     |    |    | 4            | 1961    |                              |    |    |              |
|---------------------|---------------------|----|----|--------------|---------|------------------------------|----|----|--------------|
| Date                | Phase               | h  | m  | s            | Date    | Phase                        | h  | m  | s            |
| Sept 12             | e                   | 01 | 01 | 50           | Sept 13 | Continued                    |    |    |              |
|                     | eLQ                 | 01 | 02 | 10           |         | 9.3°S 112.9°E                |    |    | Dist. 147.5° |
|                     | eLR (WNW)           | 01 | 05 | 30           |         | Depth 93 km                  |    |    |              |
| 12                  | eLQ                 | 01 | 15 | 10           | 13      | eP (dil from S)              | 21 | 31 | 39           |
|                     | eLR                 | 01 | 17 | 40           |         | eFP                          | 21 | 34 | 45           |
|                     |                     |    |    |              |         | eSKS                         | 21 | 41 | 51           |
| 12                  | eLQ                 | 01 | 25 | 40           |         | eSS                          | 21 | 47 | 11           |
|                     | eLR                 | 01 | 28 | 10           |         | eFKKS                        | 21 | 53 | 21           |
|                     |                     |    |    |              |         | eLR (SSE)                    | 21 | 59 | 21           |
| 12                  | eLQ                 | 06 | 02 | 50           |         | S. Chile                     |    |    |              |
|                     | eLR (W)             | 06 | 06 | 10           |         | USCGS 21 19 26.2             |    |    | Dist. 82.6°  |
|                     |                     |    |    |              |         | 41.6°S 73.2°W                |    |    |              |
| 12                  | eLR                 | 06 | 20 | 10           |         | Depth 154 km                 |    |    |              |
| 12                  | e(S)                | 09 | 40 | 30           | 14      | e                            | 01 | 18 | 51           |
|                     | eLR                 | 09 | 43 | 30           |         | eLR (SW)                     | 01 | 25 | 11           |
|                     |                     |    |    |              |         |                              |    |    |              |
|                     | Off coast Guatemala |    |    |              | 14      | eLR (NNE)                    | 10 | 25 | 11           |
|                     | USCGS 09 28 14.9    |    |    |              |         | Novaya Zemlya                |    |    |              |
|                     | 13.9°N 92.3°W       |    |    | Dist. 31.2°  |         | BCIS 09 56 30                |    |    |              |
|                     | Depth 83 km         |    |    |              |         |                              |    |    |              |
| 12                  | eLQ                 | 10 | 35 | 10           | 14      | e(SKS)                       | 19 | 56 | 19           |
|                     | eLR (NE)            | 10 | 38 | 10           |         | e(PS)                        | 20 | 00 | 41           |
|                     |                     |    |    |              |         | e(SS)                        | 20 | 06 | 51           |
|                     | Novaya Zemlya       |    |    |              |         | e(SKKS)                      | 20 | 07 | 35           |
|                     | BCIS 10 08 20       |    |    | Dist. 60.1°  |         | e                            | 20 | 10 | 11           |
|                     | 74.0°N 53.8°E       |    |    |              |         | eLQ                          | 20 | 18 | 11           |
|                     |                     |    |    |              |         | eLR (SW)                     | 20 | 26 | 31           |
| 12                  | eSKS                | 12 | 50 | 20           |         |                              |    |    |              |
|                     | eLQ                 | 13 | 03 | 30           |         |                              |    |    |              |
|                     | eLR (NW)            | 13 | 10 | 40           |         |                              |    |    |              |
|                     | USCGS 12 27 09.2    |    |    |              | 15      | eP                           | 01 | 58 | 14           |
|                     | 43.8°N 147.8°E      |    |    | Dist. 87.4°  |         | eS                           | 02 | 08 | 21           |
|                     | Depth 96 km         |    |    |              |         | ePS                          | 02 | 09 | 11           |
| 12                  | eLR                 | 17 | 37 | 11           |         | e                            | 02 | 11 | 35           |
|                     |                     |    |    |              |         | eSS                          | 02 | 13 | 11           |
|                     |                     |    |    |              |         | e                            | 02 | 16 | 11           |
| 12                  | eS                  | 19 | 31 | 31           |         | eLQ                          | 02 | 20 | 11           |
|                     | eLQ                 | 19 | 32 | 55           |         | eLR (NE)                     | 02 | 23 | 51           |
|                     | eLR (W)             | 19 | 35 | 11           |         |                              |    |    |              |
|                     | Baja, California    |    |    |              |         | Cyprus                       |    |    |              |
|                     | USCGS 19 18 39.2    |    |    | Dist. 33.9°  |         | USCGS 01 46 08.4             |    |    | Dist. 79.5°  |
|                     | 32.1°N 115.1°W      |    |    |              |         | 35.1°N 33.9°E                |    |    |              |
|                     | Depth 25 km         |    |    |              |         | Depth 25 km                  |    |    |              |
| 12                  | ePS                 | 19 | 56 | 51           | 15      | iP                           | 02 | 16 | 09           |
|                     | eSS                 | 20 | 03 | 11           |         | iS                           | 02 | 16 | 24           |
|                     | eLQ                 | 20 | 13 | 11           |         | eL                           | 02 | 16 | 37           |
|                     | eLR (SE)            | 20 | 18 | 27           |         |                              |    |    |              |
|                     | eLR <sub>2</sub>    | 21 | 09 | 11           |         | Near Allentown, Pennsylvania |    |    |              |
|                     | Sandwich Islands    |    |    |              | 16      | eS                           | 03 | 37 | 57           |
|                     | USCGS 19 29 05.2    |    |    |              |         | eLR                          | 03 | 41 | 11           |
|                     | 59.4°S 29.2°W       |    |    | Dist. 106.4° |         | S. Washington                |    |    |              |
|                     | Depth 25 km         |    |    |              |         | USCGS 03 25 00.3             |    |    | Dist. 34.8°  |
|                     | Z 4.0, E 1.5, N 3.5 |    |    |              |         | 45.9°N 121.9°W               |    |    |              |
|                     |                     |    |    |              |         | Depth 37 km                  |    |    |              |
| 13                  | eLQ                 | 04 | 01 | 11           | 16      | eLR                          | 05 | 48 | 11           |
|                     | eLR                 | 04 | 08 | 11           |         |                              |    |    |              |
|                     | New Guinea          |    |    |              | 16      | eLQ                          | 09 | 36 | 51           |
|                     |                     |    |    |              |         | eLR (NE)                     | 09 | 40 | 11           |
|                     |                     |    |    |              |         |                              |    |    |              |
| 13                  | e                   | 14 | 54 | 11           |         | Novaya Zemlya                |    |    |              |
|                     | eLQ                 | 15 | 16 | 11           |         | USCGS 09 08 19.8             |    |    | Dist. 60.1°  |
|                     | eLR                 | 15 | 19 | 11           |         | 73.8°N 54.0°E                |    |    |              |
|                     | S. of Java          |    |    |              | 16      | eLR                          | 11 | 16 | 41           |
|                     | USCGS 14 04 40.1    |    |    |              |         |                              |    |    |              |

(continued)

| Palisades, New York |                          |    |    | 5            | 1961    |                  |    |    |              |
|---------------------|--------------------------|----|----|--------------|---------|------------------|----|----|--------------|
| Date                | Phase                    | h  | m  | s            | Date    | Phase            | h  | m  | s            |
| Sept 16             | eLR                      | 13 | 46 | 41           | Sept 18 | Continued        |    |    |              |
|                     | Mid-Atlantic             |    |    |              |         | eSKS             | 11 | 23 | 50           |
|                     |                          |    |    |              |         | ePS              | 11 | 25 | 24           |
| 16                  | e                        | 17 | 50 | 19           |         | e                | 11 | 33 | 44           |
|                     |                          | 17 | 50 | 45           |         | eLQ              | 11 | 38 | 40           |
|                     |                          |    |    |              |         | eLR (NE)         | 11 | 42 | 12           |
| 16                  | e                        | 18 | 56 | 33           |         | Caspian Sea      |    |    |              |
|                     |                          | 18 | 56 | 57           |         | USCGS 11 01 00.8 |    |    |              |
|                     |                          |    |    |              |         | 40.8°N 50.1°E    |    |    | Dist. 83.8°  |
|                     |                          |    |    |              |         | Depth 31 km      |    |    |              |
| 17                  | eLR                      | 02 | 16 | 52           |         |                  |    |    |              |
|                     | Banda Sea                |    |    |              | 18      | e                | 16 | 26 | 18           |
|                     |                          |    |    |              |         | eLQ              | 16 | 27 | 48           |
| 17                  | ePPP                     | 09 | 04 | 08           |         | eLR (NW)         | 16 | 34 | 12           |
|                     | ePS                      | 09 | 11 | 24           |         |                  |    |    |              |
|                     | ePPS                     | 09 | 12 | 18           |         | Loyalty Islands  |    |    |              |
|                     | eSS                      | 09 | 18 | 42           |         | USCGS 15 37 33.1 |    |    |              |
|                     | eSSS                     | 09 | 22 | 12           |         | 21.0°S 173.6°E   |    |    | Dist. 119.9° |
|                     | eLQ                      | 09 | 26 | 02           |         | Depth 28 km      |    |    |              |
|                     | eLR                      | 09 | 32 | 52           |         |                  |    |    |              |
|                     |                          |    |    |              | 19      | eLR              | 00 | 31 | 12           |
|                     | Off coast Formosa        |    |    |              |         |                  |    |    |              |
|                     | USCGS 08 41 53.6         |    |    |              | 19      | eP               | 02 | 35 | 16           |
|                     | 23.9°N 122.2°E           |    |    | Dist. 113.6° |         | epP              | 02 | 37 | 09           |
|                     | Depth 35 km              |    |    |              |         | ePPP             | 02 | 39 | 17           |
|                     |                          |    |    |              |         | epPPP            | 02 | 40 | 31           |
| 17                  | eLQ                      | 16 | 11 | 12           |         | eS               | 02 | 42 | 57           |
|                     | eLR (WNW)                | 16 | 15 | 28           |         | eScS             | 02 | 43 | 59           |
|                     |                          |    |    |              |         | eSS              | 02 | 47 | 17           |
|                     | Skamania Co., Washington |    |    |              |         | esSS             | 02 | 47 | 53           |
|                     | USCGS 15 55 58.9         |    |    | Dist. 34.8°  |         | eSSS             | 02 | 50 | 35           |
|                     | 45.9°N 122.0°W           |    |    |              |         | esSSS            | 02 | 51 | 13           |
|                     | Depth 24 km              |    |    |              |         | eLQ              | 02 | 55 | 13           |
|                     |                          |    |    |              |         | eLR (S)          | 02 | 59 | 13           |
| 17                  | ePP                      | 23 | 43 | 42           |         |                  |    |    |              |
|                     | ePKS                     | 23 | 44 | 12           |         |                  |    |    |              |
|                     | ePPS                     | 23 | 55 | 12           |         | S. Bolivia       |    |    |              |
|                     | eScSPKP                  | 23 | 56 | 32           |         | USCGS 02 25 49.2 |    |    |              |
| 18                  | eSS                      | 00 | 01 | 36           |         | 20.3°S 63.2°W    |    |    | Dist. 61.5°  |
|                     | eSSS                     | 00 | 08 | 24           |         | Depth 609 km     |    |    |              |
|                     | e                        | 00 | 15 | 40           |         |                  |    |    |              |
|                     | eLQ                      | 00 | 17 | 42           |         |                  |    |    |              |
|                     | eLR (NW)                 | 00 | 22 | 12           |         |                  |    |    |              |
|                     | Near E. coast New Guinea |    |    |              | 19      | eP               | 09 | 53 | 11           |
|                     | USCGS 23 22 06.3         |    |    |              |         | ePP              | 09 | 53 | 41           |
|                     | 5.9°S 147.4°E            |    |    | Dist. 129.5° |         | eS               | 09 | 58 | 45           |
|                     | Depth 45 km              |    |    |              |         | ePcS             | 09 | 59 | 37           |
|                     |                          |    |    |              |         | eSS              | 10 | 01 | 19           |
|                     |                          |    |    |              |         | eLQ              | 10 | 01 | 29           |
|                     |                          |    |    |              |         | eLR (S)          | 10 | 03 | 01           |
| 18                  | eLR                      | 01 | 02 | 12           |         |                  |    |    |              |
|                     |                          |    |    |              |         | S. of Panama     |    |    |              |
|                     |                          |    |    |              |         | USCGS 09 46 17.7 |    |    |              |
|                     |                          |    |    |              |         | 6.7°N 82.4°W     |    |    | Dist. 34.6°  |
|                     |                          |    |    |              |         | Depth 33 km      |    |    | Mag. 5¼-5½   |
| 18                  | eP                       | 02 | 32 | 46           |         | Z 17, E 10, N 17 |    |    |              |
|                     | epP                      | 02 | 32 | 52           |         |                  |    |    |              |
|                     | ePP                      | 02 | 34 | 20           |         |                  |    |    |              |
|                     | eS                       | 02 | 38 | 48           |         |                  |    |    |              |
|                     | eSS                      | 02 | 41 | 38           |         |                  |    |    |              |
|                     | eLR (NNW)                | 02 | 43 | 52           |         |                  |    |    |              |
|                     | Vancouver Island region  |    |    |              | 19      | ePS              | 22 | 02 | 55           |
|                     | USCGS 02 25 19.3         |    |    |              |         | eSS              | 22 | 09 | 13           |
|                     | 48.8°N 128.9°W           |    |    | Dist. 39.0°  |         | e                | 22 | 17 | 13           |
|                     | Depth 21 km              |    |    | Mag. 4¼-5    |         | eLQ              | 22 | 19 | 43           |
|                     | Z 6, E 3, N 4            |    |    |              |         | eLR              | 22 | 25 | 13           |
| 18                  | eLR (NE)                 | 08 | 29 | 52           |         |                  |    |    |              |
|                     |                          |    |    |              |         | Sandwich Islands |    |    |              |
|                     | Novaya Zemlya            |    |    |              |         | USCGS 21 34 43.3 |    |    |              |
|                     | KEW 07 59 52             |    |    |              |         | 60.1°S 22.9°W    |    |    | Dist. 108.9° |
|                     | 74.5°N 52.6°E            |    |    | Dist. 59.2°  |         | Depth 56 km      |    |    |              |
| 18                  | eP                       | 11 | 13 | 29           |         |                  |    |    |              |
|                     | epP                      | 11 | 13 | 40           |         |                  |    |    |              |

(continued)



| Palisades, New York |                     |             |        | 6  |         |                  |         | 1961   |    |    |  |
|---------------------|---------------------|-------------|--------|----|---------|------------------|---------|--------|----|----|--|
| Date                | Phase               | h           | m      | s  | Date    | Phase            | h       | m      | s  |    |  |
| Sept 20             | eSS                 | 19          | 41     | 22 | Sept 25 | Continued        |         |        |    |    |  |
|                     | e(SKSSKS)           | 19          | 43     | 38 |         | ePPP             | 02      | 38     | 54 |    |  |
|                     | eSSS                | 19          | 49     | 22 |         | eS               | 02      | 43     | 30 |    |  |
|                     | eLQ                 | 19          | 55     | 50 |         | e(ScS)           | 02      | 44     | 50 |    |  |
|                     | eLR (NW)            | 20          | 00     | 50 |         | eSS              | 02      | 46     | 24 |    |  |
|                     | New Britain         |             |        |    |         | eSSS             | 02      | 47     | 54 |    |  |
|                     | USCGS 19 03 37.1    |             |        |    |         | eLQ              | 02      | 49     | 14 |    |  |
|                     | 3.6°S 150.9°E       | Dist.       | 125.4° |    |         | eLR (NW)         | 02      | 50     | 34 |    |  |
|                     | Depth 30 km         |             |        |    |         | S. Alaska        |         |        |    |    |  |
|                     |                     |             |        |    |         | USCGS 02 27 13.4 |         |        |    |    |  |
| 23                  | eS                  | 03          | 22     | 04 |         | 60.3°N 153.0°W   | Dist.   | 50.4°  |    |    |  |
|                     | eScS                | 03          | 22     | 50 |         | Depth 125 km     |         |        |    |    |  |
|                     | eSS                 | 03          | 27     | 06 |         |                  |         |        |    |    |  |
|                     | e(SSS)              | 03          | 30     | 22 | 25      | eP               | 05      | 40     | 18 |    |  |
|                     | eLQ                 | 03          | 31     | 06 |         | iS               | 05      | 49     | 28 |    |  |
|                     | eFKKP               | 03          | 32     | 22 |         | eScS             | 05      | 50     | 16 |    |  |
|                     | eLR (WSW)           | 03          | 34     | 44 |         | eSS              | 05      | 53     | 48 |    |  |
|                     | Hawaii Islands      |             |        |    |         | eLQ              | 05      | 57     | 24 |    |  |
|                     | USCGS 03 01 35.7    |             |        |    |         | eLR (W)          | 06      | 02     | 54 |    |  |
|                     | 19.8°N 155.2°W      | Dist.       | 70.6°  |    |         | Hawaii Islands   |         |        |    |    |  |
|                     | Depth 31 km         |             |        |    |         | USCGS 05 29 00.8 |         |        |    |    |  |
|                     |                     |             |        |    |         | 19.9°N 155.3°W   | Dist.   | 70.6°  |    |    |  |
| 23                  | e                   | 03          | 59     | 52 |         | Depth 82 km      |         |        |    |    |  |
|                     | eLR (E)             | 04          | 04     | 44 |         |                  |         |        |    |    |  |
| 23                  | eLR (SW)            | 09          | 12     | 44 |         | 25               | e       | 11     | 46 | 50 |  |
|                     | Kermadec            |             |        |    |         | eLQ              | 11      | 50     | 44 |    |  |
|                     |                     |             |        |    |         | eLR (NW)         | 11      | 55     | 54 |    |  |
| 23                  | eLR (SE)            | 11          | 24     | 14 |         | 25               | eS      | 21     | 28 | 14 |  |
|                     |                     |             |        |    |         | eLQ              | 21      | 32     | 54 |    |  |
| 24                  | eLR                 | 05          | 38     | 34 |         | eLR (NE)         | 21      | 35     | 44 |    |  |
|                     |                     |             |        |    |         | Svalbard region  |         |        |    |    |  |
| 24                  | eLR                 | 17          | 42     | 14 |         | USCGS 21 12 41.0 |         |        |    |    |  |
|                     | Sandwich Islands    |             |        |    |         | 75.9°N 7.3°E     | Dist.   | 48.5°  |    |    |  |
|                     |                     |             |        |    |         | Depth 64 km      |         |        |    |    |  |
| 24                  | eP                  | 19          | 10     | 50 |         |                  |         |        |    |    |  |
|                     | epP                 | 19          | 11     | 14 |         | 26               | eLR (W) | 08     | 07 | 14 |  |
|                     | ePP                 | 19          | 11     | 58 |         |                  |         |        |    |    |  |
|                     | eS                  | 19          | 15     | 44 |         | 26               | i       | 16     | 23 | 33 |  |
|                     | eLQ                 | 19          | 17     | 44 |         |                  |         |        |    |    |  |
|                     | eLR (SW)            | 19          | 19     | 14 |         | 26               | i       | 17     | 23 | 20 |  |
|                     | Puebla, Mexico      |             |        |    |         | i                | 17      | 23     | 46 |    |  |
|                     | USCGS 19 04 40.7    |             |        |    |         |                  |         |        |    |    |  |
|                     | 18.4°N 98.6°W       | Dist.       | 31.5°  |    |         | 26               | e       | 19     | 09 | 05 |  |
|                     | Depth 81 km         |             |        |    |         | eLQ              | 19      | 09     | 55 |    |  |
|                     |                     |             |        |    |         | eLR (SE)         | 19      | 11     | 15 |    |  |
| 24                  | ePP                 | 21          | 58     | 46 |         | 26               | e       | 19     | 59 | 21 |  |
|                     | eSKS                | 22          | 04     | 48 |         |                  |         |        |    |    |  |
|                     | ePS                 | 22          | 06     | 54 |         | 27               | eS      | 02     | 08 | 15 |  |
|                     | ePPS                | 22          | 07     | 38 |         | eLQ              | 02      | 11     | 45 |    |  |
|                     | eSS                 | 22          | 13     | 22 |         | eLR (WSW)        | 02      | 13     | 45 |    |  |
|                     | eLQ                 | 22          | 24     | 34 |         | Jalisco, Mexico  |         |        |    |    |  |
|                     | eLR (NW)            | 22          | 30     | 14 |         | USCGS 01 55 31.9 |         |        |    |    |  |
|                     | S. of Honshu, Japan |             |        |    |         | 19.2°N 105.1°W   | Dist.   | 34.4°  |    |    |  |
|                     | USCGS 21 40 58.8    |             |        |    |         | Depth 54 km      |         |        |    |    |  |
|                     | 33.3°N 141.3°E      | Dist.       | 99.6°  |    |         |                  |         |        |    |    |  |
|                     | Depth 93 km         |             |        |    |         | 27               | eSKS    | 06     | 59 | 27 |  |
| 24                  | eLR                 | 23          | 47     | 44 |         | essSES           | 07      | 01     | 27 |    |  |
|                     |                     |             |        |    |         | eSP              | 07      | 03     | 07 |    |  |
| 25                  | e                   | 01          | 40     | 00 |         | essSP            | 07      | 07     | 33 |    |  |
|                     | eLQ                 | 01          | 47     | 14 |         | eSS              | 07      | 10     | 45 |    |  |
|                     | eLR (SE)            | 01          | 50     | 14 |         | eSSS (NW)        | 07      | 15     | 07 |    |  |
|                     |                     |             |        |    |         | Fiji Islands     |         |        |    |    |  |
| 25                  | eP                  | 02          | 35     | 58 |         | USCGS 06 34 03.7 |         |        |    |    |  |
|                     | epP                 | 02          | 36     | 24 |         | 17.4°S 178.7°W   | Dist.   | 112.2° |    |    |  |
|                     |                     | (continued) |        |    |         | Depth 576 km     |         |        |    |    |  |

| Palisades, New York |                        |             |                                | 7  |         |                     |             | 1961   |    |    |  |
|---------------------|------------------------|-------------|--------------------------------|----|---------|---------------------|-------------|--------|----|----|--|
| Date                | Phase                  | h           | m                              | s  | Date    | Phase               | h           | m      | s  |    |  |
| Sept 27             | eP                     | 11          | 31                             | 05 | Sept 28 | eSSS                | 03          | 57     | 15 |    |  |
|                     | epP                    | 11          | 31                             | 15 |         | eSSS                | 04          | 04     | 15 |    |  |
|                     | eS                     | 11          | 39                             | 26 |         | eLQ                 | 04          | 09     | 15 |    |  |
|                     | eSS                    | 11          | 43                             | 45 |         | eLR (NW)            | 04          | 15     | 15 |    |  |
|                     | eLQ                    | 11          | 46                             | 15 |         | S. of Honshu, Japan |             |        |    |    |  |
|                     | eLR (NW)               | 11          | 50                             | 35 |         | USCGS 03 24 43.4    |             |        |    |    |  |
|                     | Fox Islands, Aleutians |             |                                |    |         | 30.5°N 141.3°E      | Dist.       | 101.4° |    |    |  |
|                     | USCGS 11 20 46.8       |             |                                |    |         | Depth 125 km        |             |        |    |    |  |
|                     | 52.3°N 168.7°W         | Dist.       | 61.8°                          |    |         | Z 2.5, --, --       |             |        |    |    |  |
|                     | Depth 27 km            |             |                                |    |         |                     |             |        |    |    |  |
| 27                  | eSKS                   | 12          | 32                             | 33 | 28      | e                   | 13          | 57     | 38 |    |  |
|                     | ePS                    | 12          | 35                             | 43 |         | i                   | 13          | 58     | 25 |    |  |
|                     | eSS                    | 12          | 41                             | 55 | 28      | e                   | 18          | 22     | 25 |    |  |
|                     | eLQ                    | 12          | 52                             | 25 |         | e                   | 18          | 27     | 19 |    |  |
|                     | eLR (SE)               | 12          | 57                             | 35 |         | eLR                 | 18          | 38     | 45 |    |  |
|                     | Sandwich Islands       |             |                                |    |         | New Britain         |             |        |    |    |  |
|                     | USCGS 12 07 39.2       |             |                                |    |         | USCGS 17 37 10.1    |             |        |    |    |  |
|                     | 59.4°S 24.2°W          | Dist.       | 107.8°                         |    |         | 5.5°S 152.2°E       | Dist.       | 126.3° |    |    |  |
|                     | Depth 110 km           |             |                                |    |         | Depth 113 km        |             |        |    |    |  |
| 27                  | eP                     | 19          | 31                             | 04 | 28      | eLQ                 | 22          | 09     | 15 |    |  |
|                     | epP                    | 19          | 31                             | 15 |         | eLR                 | 22          | 12     | 15 |    |  |
|                     | eS                     | 19          | 39                             | 27 | 28      | eLQ                 | 23          | 21     | 45 |    |  |
|                     | eScS                   | 19          | 41                             | 11 |         | eLR                 | 23          | 25     | 15 |    |  |
|                     | eSS                    | 19          | 43                             | 43 |         | S. Iran             |             |        |    |    |  |
|                     | eLR (NW)               | 19          | 52                             | 15 |         |                     |             |        |    |    |  |
|                     | Fox Islands, Aleutians |             |                                |    |         | 29                  | eLR         | 03     | 58 | 15 |  |
|                     | USCGS 19 20 48.6       |             |                                |    |         |                     |             |        |    |    |  |
|                     | 52.5°N 168.7°W         | Dist.       | 61.3°                          |    |         | 29                  | eL          | 06     | 27 | 15 |  |
|                     | Depth 42 km            |             |                                |    |         |                     |             |        |    |    |  |
| 27                  | eP                     | 19          | 37                             | 23 | 29      | eLR                 | 09          | 02     | 15 |    |  |
|                     | epP                    | 19          | 37                             | 35 |         | Argentina           |             |        |    |    |  |
|                     | eS                     | 19          | 45                             | 35 | 29      | eLR                 | 09          | 48     | 15 |    |  |
|                     | eSS                    | 19          | 50                             | 15 |         | Andaman Island      |             |        |    |    |  |
|                     | eLR (NW)               | 19          | 56                             | 15 |         |                     |             |        |    |    |  |
|                     | Fox Islands, Aleutians |             |                                |    |         | 29                  | eS          | 17     | 14 | 15 |  |
|                     | USCGS 19 27 00.7       |             |                                |    |         | ePS                 | 17          | 15     | 15 |    |  |
|                     | 52.2°N 168.7°W         | Dist.       | 61.8°                          |    |         | eSS                 | 17          | 20     | 45 |    |  |
|                     | Depth 22 km            | Mag.        | 5 <sup>+</sup>                 |    |         | eLQ                 | 17          | 30     | 15 |    |  |
|                     | Z 11, E 4, N 4         |             |                                |    |         | eLR                 | 17          | 33     | 55 |    |  |
| 28                  | ePKP                   | 01          | 43                             | 23 |         | Hokkaido, Japan     |             |        |    |    |  |
|                     | ePP                    | 01          | 46                             | 39 |         | USCGS 16 50 32.9    |             |        |    |    |  |
|                     | ePKS                   | 01          | 47                             | 03 |         | 42.9°N 145.4°E      | Dist.       | 89.3°  |    |    |  |
|                     | ePKKP                  | 01          | 53                             | 01 |         | Depth 37 km         |             |        |    |    |  |
|                     | ePPS                   | 01          | 59                             | 27 | 29      | ePP                 | 19          | 28     | 48 |    |  |
|                     | eSS                    | 02          | 05                             | 43 |         | ePKS                | 19          | 29     | 15 |    |  |
|                     | e(SKSSKS)              | 02          | 06                             | 35 |         | epPKS               | 19          | 30     | 23 |    |  |
|                     | e                      | 02          | 10                             | 15 |         | ePKKP               | 19          | 34     | 51 |    |  |
|                     | eSSS                   | 02          | 12                             | 25 |         | ePS                 | 19          | 37     | 55 |    |  |
|                     | e                      | 02          | 17                             | 09 |         | ePPS                | 19          | 40     | 15 |    |  |
|                     | e                      | 02          | 20                             | 55 |         | eSS                 | 19          | 45     | 55 |    |  |
|                     | eLQ                    | 02          | 27                             | 45 |         | essS                | 19          | 47     | 15 |    |  |
|                     | eLR (NE)               | 02          | 34                             | 15 |         | eSSS                | 19          | 54     | 45 |    |  |
|                     | Sumatra                |             |                                |    |         | eLQ                 | 20          | 05     | 45 |    |  |
|                     | USCGS 01 23 59.6       |             |                                |    |         | eLR (NW)            | 20          | 11     | 15 |    |  |
|                     | 3.9°S 102.0°E          | Dist.       | 142.9°                         |    |         | eLR <sub>2</sub>    | 20          | 54     | 15 |    |  |
|                     | Depth 78 km            | Mag.        | 5 <sup>+</sup> -5 <sup>+</sup> |    |         | Northern Celebes    |             |        |    |    |  |
|                     | Z 4, --, --            |             |                                |    |         | USCGS 19 06 13.4    |             |        |    |    |  |
| 28                  | eSKS                   | 03          | 50                             | 01 |         | 0.5°N 122.4°E       | Dist.       | 135.7° |    |    |  |
|                     | eSKKS                  | 03          | 50                             | 49 |         | Depth 110 km        |             |        |    |    |  |
|                     | eSKKKS                 | 03          | 51                             | 41 |         |                     |             |        |    |    |  |
|                     |                        | (continued) |                                |    |         | 29                  | eP          | 22     | 45 | 31 |  |
|                     |                        |             |                                |    |         |                     | (continued) |        |    |    |  |





| Palisades, New York |                         |              | 10     |                       |              | 1961 |  |  |
|---------------------|-------------------------|--------------|--------|-----------------------|--------------|------|--|--|
| Date                | Phase                   | h m s        | Date   | Phase                 | h m s        |      |  |  |
| Oct 12              | eLR                     | 02 10 38     | Oct 13 | eLR                   | 15 32 08     |      |  |  |
| 12                  | eSS                     | 06 40 28     | 13     | eSKKKS                | 17 55 08     |      |  |  |
|                     | eSSS                    | 06 44 18     |        | ePS                   | 17 57 08     |      |  |  |
|                     | eLQ                     | 06 56 08     |        | eSS                   | 18 03 16     |      |  |  |
|                     | eLR (NW)                | 07 01 18     |        | eLR                   | 18 16 38     |      |  |  |
|                     | eLR <sub>2</sub> (SE)   | 07 50 38     |        |                       |              |      |  |  |
|                     | Near coast New Guinea   |              |        | Tonga Islands         |              |      |  |  |
|                     | USCGS 06 01 25.5        |              |        | USCGS 17 28 21.5      |              |      |  |  |
|                     | 2.9°S 144.9°E           | Dist. 128.5° |        | 22.0°S 176.9°W        | Dist. 113.7° |      |  |  |
|                     | Depth 25 km             |              |        | Depth 155 km          |              |      |  |  |
| 12                  | eLQ                     | 09 17 28     | 13     | e                     | 18 31 44     |      |  |  |
|                     | eLR (NW)                | 09 24 08     |        | e                     | 18 32 10     |      |  |  |
|                     | New Britain region      |              | 14     | eLR                   | 13 16 38     |      |  |  |
|                     |                         |              |        | S. of Honshu, Japan   |              |      |  |  |
| 12                  | iP                      | 13 58 59     | 14     | eLR                   | 17 04 28     |      |  |  |
|                     | eS                      | 14 02 49     |        |                       |              |      |  |  |
|                     | N. of Puerto Rico       |              | 14     | e                     | 17 39 38     |      |  |  |
|                     | USCGS 13 53 41.3        |              |        | e                     | 17 39 57     |      |  |  |
|                     | 19.1°N 66.0°W           | Dist. 22.9°  |        |                       |              |      |  |  |
|                     | Depth 63 km             |              | 14     | eLR                   | 18 19 08     |      |  |  |
| 12                  | eLR                     | 18 07 08     | 14     | eLQ                   | 22 29 08     |      |  |  |
| 12                  | eLR                     | 18 45 08     |        | eLR                   | 22 36 28     |      |  |  |
|                     |                         |              |        | Kamchatka             |              |      |  |  |
| 12                  | eLQ                     | 20 03 28     | 15     | eLQ                   | 09 10 28     |      |  |  |
|                     | eLR                     | 20 07 28     |        | eLR                   | 09 13 08     |      |  |  |
|                     | Formosa                 |              | 15     | eLR                   | 11 54 48     |      |  |  |
| 12                  | eSSS                    | 22 45 08     | 15     | eLR                   | 21 19 08     |      |  |  |
|                     | eLQ                     | 22 59 08     |        |                       |              |      |  |  |
|                     | eLR                     | 23 06 08     | 15     | eLR                   | 21 19 08     |      |  |  |
|                     | S. of Macquarie Islands |              |        | Central Utah          |              |      |  |  |
|                     | USCGS 21 57 35.0        |              |        | USCGS 21 05 00.1      |              |      |  |  |
|                     | 60.7°S 153.8°E          | Dist. 144.9° |        | 39.3°N 111.5°W        | Dist. 30.4°  |      |  |  |
|                     | Depth 25 km             |              |        | Depth 25 km           |              |      |  |  |
| 13                  | eP                      | 05 13 28     | 15     | eLQ                   | 23 01 28     |      |  |  |
|                     | eFP                     | 05 17 42     |        | eLR                   | 23 08 08     |      |  |  |
|                     | eSKS                    | 05 23 28     | 16     | eLR                   | 05 51 28     |      |  |  |
|                     | ePS                     | 05 26 16     |        |                       |              |      |  |  |
|                     | eSS                     | 05 32 08     | 16     | eLR                   | 13 11 28     |      |  |  |
|                     | eSSS                    | 05 41 38     | 16     | e                     | 21 21 15     |      |  |  |
|                     | e                       | 05 45 32     |        | e                     | 21 21 39     |      |  |  |
|                     | eLR (SE)                | 05 47 58     | 16     | eLR                   | 21 52 48     |      |  |  |
|                     | Sandwich Islands        |              | 17     | eLR (SE)              | 00 45 08     |      |  |  |
|                     | USCGS 04 59 04.8        |              | 17     | eLR (E)               | 01 17 08     |      |  |  |
|                     | 55.9°S 27.2°W           | Dist. 104.5° |        |                       |              |      |  |  |
|                     | Depth 67 km             | Mag. 5¼-5½   | 17     | ePS                   | 04 57 28     |      |  |  |
|                     | * Z 2, E 2, N 2         |              |        | eSS                   | 05 03 12     |      |  |  |
| 13                  | eFP                     | 11 05 18     |        | e                     | 05 03 40     |      |  |  |
|                     | eSKS                    | 11 11 34     |        | eSSS                  | 05 07 28     |      |  |  |
|                     | ePS                     | 11 14 38     |        | eLQ                   | 05 14 28     |      |  |  |
|                     | ePPS                    | 11 15 22     |        | eLR (SE)              | 05 20 48     |      |  |  |
|                     | eSS                     | 11 20 36     |        |                       |              |      |  |  |
|                     | eSSS                    | 11 25 44     |        | Bouvet Islands region |              |      |  |  |
|                     | eLQ                     | 11 32 38     |        | USCGS 04 27 33.5      | Dist. 115.5° |      |  |  |
|                     | eLR (SE)                | 11 36 08     |        | 55.8°S 0.5°E          | Mag. 5¼      |      |  |  |
|                     | Sandwich Islands        |              |        | Depth 25 km           |              |      |  |  |
|                     | USCGS 10 46 47.7        |              |        | * Z 3, E 1.0, N 1.5   |              |      |  |  |
|                     | 60.3°S 34.3°W           | Dist. 105.8° |        |                       |              |      |  |  |
|                     | Depth 44 km             | Mag. 5¼-5½   |        |                       |              |      |  |  |
|                     | * Z 4, E 3, N 2         |              |        |                       |              |      |  |  |
| 13                  | e                       | 13 30 47     |        |                       |              |      |  |  |

| Palisades, New York |                           |             | 11     |                             |              | 1961 |  |  |
|---------------------|---------------------------|-------------|--------|-----------------------------|--------------|------|--|--|
| Date                | Phase                     | h m s       | Date   | Phase                       | h m s        |      |  |  |
| Oct 17              | eLR (NW)                  | 06 10 08    | Oct 19 | eS                          | 08 53 17     |      |  |  |
|                     |                           |             |        | eSS                         | 08 58 47     |      |  |  |
| 17                  | eLQ                       | 11 52 38    |        | eLQ                         | 09 04 07     |      |  |  |
|                     | eLR (NW)                  | 11 58 08    |        | eLR                         | 09 08 27     |      |  |  |
|                     | S. of Guam                |             |        | Near coast Central Chile    |              |      |  |  |
| 17                  | e                         | 14 37 07    |        | USCGS 08 31 29.3            |              |      |  |  |
|                     | eLR                       | 14 51 37    |        | 36.9°S 72.7°W               | Dist. 77.6°  |      |  |  |
|                     |                           |             |        | Depth 61 km                 |              |      |  |  |
| 17                  | eLR                       | 16 08 37    | 19     | e                           | 11 25 39     |      |  |  |
|                     |                           |             |        | eLR (SW)                    | 11 29 07     |      |  |  |
| 17                  | eLR                       | 20 51 37    | 19     | eP                          | 11 31 03     |      |  |  |
|                     |                           |             |        | epP                         | 11 31 35     |      |  |  |
| 17                  | eLR                       | 22 26 27    |        | eS                          | 11 40 43     |      |  |  |
|                     |                           |             |        | ePPS                        | 11 41 49     |      |  |  |
| 17                  | eLR                       | 23 57 37    |        | eSS                         | 11 45 47     |      |  |  |
|                     |                           |             |        | eLQ                         | 11 50 47     |      |  |  |
| 18                  | eLR                       | 00 47 47    |        | eLR (S)                     | 11 54 27     |      |  |  |
|                     |                           |             |        | Neuquen Province, Argentina |              |      |  |  |
| 18                  | eLQ                       | 03 40 07    |        | USCGS 11 19 19.6            |              |      |  |  |
|                     | eLR (SW)                  | 03 46 47    |        | 37.1°S 69.8°W               | Dist. 77.7°  |      |  |  |
|                     | Kermadec                  |             |        | Depth 155 km                |              |      |  |  |
| 18                  | eLR                       | 07 30 37    | 19     | eLR                         | 14 00 27     |      |  |  |
|                     | Tonga Islands             |             |        | New Hebrides                |              |      |  |  |
| 18                  | eSSS                      | 11 07 37    | 19     | ePKP                        | 19 46 20     |      |  |  |
|                     | eLR (NW)                  | 11 14 37    |        | eSS                         | 20 09 27     |      |  |  |
|                     | Aleutians                 |             |        | eSSS                        | 20 14 47     |      |  |  |
|                     | USCGS 10 44 10.7          |             |        | e                           | 20 27 57     |      |  |  |
|                     | 53.6°N 165.6°W            | Dist. 59.3° |        | eLQ                         | 20 30 37     |      |  |  |
|                     | Depth 47 km               |             |        | eLR                         | 20 38 07     |      |  |  |
| 18                  | e                         | 12 43 37    |        | S. of Australis             |              |      |  |  |
|                     | eLR                       | 12 50 47    |        | USCGS 19 26 32.2            |              |      |  |  |
|                     |                           |             |        | 55.3°S 146.4°E              | Dist. 150.3° |      |  |  |
| 18                  | i                         | 16 20 25    |        | Depth 50 km                 |              |      |  |  |
| 18                  | eP                        | 17 03 51    | 20     | eLR                         | 04 54 07     |      |  |  |
|                     | P (Z) 10 sec 5 mic comp S |             |        | Solomon Islands             |              |      |  |  |
|                     | epP                       | 17 04 09    | 20     | e                           | 08 11 37     |      |  |  |
|                     | ePP                       | 17 06 35    |        | eLQ                         | 08 27 07     |      |  |  |
|                     | ePPP                      | 17 08 13    |        | eLR                         | 08 30 07     |      |  |  |
|                     | iS                        | 17 13 42    |        | Novaya Zemlya               |              |      |  |  |
|                     | ePS                       | 17 14 31    |        | BCIS 08 07 10               |              |      |  |  |
|                     | ePPS                      | 17 14 47    |        | USCGS 08 07 00              |              |      |  |  |
|                     | eSS                       | 17 18 31    | 20     | eLR                         | 13 29 37     |      |  |  |
|                     | eLQ                       | 17 25 17    |        |                             |              |      |  |  |
|                     | eLR (SSE)                 | 17 29 47    | 20     | eLR                         | 18 41 47     |      |  |  |
|                     | Near S. coast Chile       |             |        | W. China                    |              |      |  |  |
|                     | USCGS 16 52 00.2          |             | 20     | eLR                         | 18 57 37     |      |  |  |
|                     | 36.7°S 72.6°W             | Dist. 77.6° |        | eLR                         | 20 08 47     |      |  |  |
|                     | Depth 67 km               | Mag. 5¼     |        | Kern Co., California        |              |      |  |  |
| 19                  | eLR                       | 00 07 27    | 21     | eLR                         | 03 14 37     |      |  |  |
| 19                  | eLR                       | 04 04 07    | 21     | eLR                         | 04 42 07     |      |  |  |
|                     |                           |             |        | eLR                         | 07 10 07     |      |  |  |
| 19                  | eS                        | 05 22 15    | 21     | eLQ                         | 16 18 07     |      |  |  |
|                     | eLR (WNW)                 | 15 25 07    |        | eLR                         | 16 23 07     |      |  |  |
|                     | S. California             |             |        |                             |              |      |  |  |
|                     | USCGS 05 09 44.0          |             |        |                             |              |      |  |  |
|                     | 35.8°N 117.9°W            | Dist. 34.6° |        |                             |              |      |  |  |
|                     | Depth 22 km               |             |        |                             |              |      |  |  |



| Palisades, New York |                         |              |    | 12 |        |                  |              |    |    |
|---------------------|-------------------------|--------------|----|----|--------|------------------|--------------|----|----|
| Date                | Phase                   | h            | m  | s  | Date   | Phase            | h            | m  | s  |
| Oct 21              | eLR                     | 18           | 03 | 37 | Oct 23 | Continued        |              |    |    |
|                     | Santa Cruz Islands      |              |    |    |        | e(PFP)           | 08           | 44 | 55 |
|                     |                         |              |    |    |        | e(PcS)           | 08           | 45 | 39 |
| 21                  | eLR                     | 18           | 30 | 07 |        | eS               | 08           | 49 | 59 |
|                     |                         |              |    |    |        | e(GcS)           | 08           | 51 | 07 |
| 21                  | i                       | 19           | 16 | 07 |        | eSS              | 08           | 54 | 27 |
|                     |                         |              |    |    |        | eLR (NNE)        | 09           | 00 | 07 |
| 21                  | i                       | 19           | 17 | 28 |        | Novaya Zemlya    |              |    |    |
|                     | i                       | 19           | 17 | 47 |        | BCIS 08 31 26    |              |    |    |
|                     |                         |              |    |    |        | 74.7°N 54.9°E    | Dist. 59.5°  |    |    |
| 21                  | eLR                     | 23           | 56 | 07 |        |                  | Mag. 4.5     |    |    |
|                     | Aleutians               |              |    |    |        |                  |              |    |    |
| 22                  | eLR                     | 00           | 16 | 07 | 23     | eLR (N)          | 10           | 17 | 07 |
|                     |                         |              |    |    |        |                  |              |    |    |
| 22                  | eS                      | 07           | 16 | 39 | 23     | e                | 10           | 59 | 37 |
|                     | eSS                     | 07           | 19 | 53 |        | eLR              | 11           | 18 | 07 |
|                     | eLR                     | 07           | 23 | 37 |        |                  |              |    |    |
|                     | W. of Galapagos Islands |              |    |    | 23     | ePP              | 15           | 01 | 10 |
|                     | USCGS 07 01 42.1        |              |    |    |        | ePKS             | 15           | 02 | 16 |
|                     | 0.2°S 94.6°W            | Dist. 45.1   |    |    |        | eSKKS            | 15           | 07 | 56 |
|                     | Depth 60 km             |              |    |    |        | ePS              | 15           | 11 | 36 |
|                     |                         |              |    |    |        | ePPS             | 15           | 13 | 20 |
| 22                  | e(PPS)                  | 10           | 23 | 01 |        | eSS              | 15           | 19 | 36 |
|                     | e(SS)                   | 10           | 27 | 23 |        | e                | 15           | 21 | 02 |
|                     | e(SSS)                  | 10           | 32 | 07 |        | e                | 15           | 24 | 38 |
|                     | e(SKKS)                 | 10           | 35 | 07 |        | eSSS             | 15           | 28 | 16 |
|                     | eLQ                     | 10           | 40 | 27 |        | eLQ              | 15           | 35 | 46 |
|                     | eLR (SW)                | 10           | 46 | 07 |        | eLR (SE)         | 15           | 40 | 46 |
|                     | New Hebrides Islands    |              |    |    |        | Molucca Passage  |              |    |    |
|                     | USCGS 09 50 43.6        |              |    |    |        | USCGS 14 39 33.5 | Dist. 131.6° |    |    |
|                     | 19.9°S 172.4°E          | Dist. 120.8° |    |    |        | 3.5°N 126.4°E    | Mag. 5.6     |    |    |
|                     | Depth 181 km            |              |    |    |        | Depth 25 km      |              |    |    |
|                     |                         |              |    |    |        | Z 11, E 3, N 8   |              |    |    |
| 22                  | eLQ                     | 13           | 27 | 07 | 23     | eLQ              | 21           | 06 | 06 |
|                     | eLR                     | 13           | 29 | 07 |        | eLR              | 21           | 09 | 46 |
|                     | W. of Galapagos         |              |    |    |        | Molucca Passage  |              |    |    |
| 22                  | ePcS                    | 15           | 25 | 47 | 24     | e                | 01           | 27 | 06 |
|                     | eLQ                     | 15           | 27 | 07 |        | eLR              | 01           | 33 | 06 |
|                     | eLR (SW)                | 15           | 30 | 07 |        | Japan            |              |    |    |
|                     | Off coast Costa Rica    |              |    |    | 24     | eLR              | 02           | 25 | 06 |
|                     | USCGS 15 13 32.3        |              |    |    |        | Molucca Passage  |              |    |    |
|                     | 10.5°N 86.6°W           | Dist. 32.0°  |    |    |        |                  |              |    |    |
|                     | Depth 51 km             |              |    |    |        |                  |              |    |    |
| 23                  | ePP                     | 00           | 27 | 17 | 24     | ePPP             | 07           | 42 | 46 |
|                     | eSKS                    | 00           | 33 | 35 |        | eSKS             | 07           | 48 | 34 |
|                     | eSKKS                   | 00           | 34 | 47 |        | ePKKS            | 07           | 58 | 36 |
|                     | ePS                     | 00           | 36 | 29 |        | eLR              | 08           | 03 | 46 |
|                     | ePPS                    | 00           | 37 | 17 |        | Hokkaido, Japan  |              |    |    |
|                     | ePKKP                   | 00           | 39 | 07 |        | USCGS 07 25 19.9 | Dist. 87.2°  |    |    |
|                     | eSS                     | 00           | 42 | 23 |        | 45.0°N 146.4°E   |              |    |    |
|                     | ePcPPKP                 | 00           | 43 | 03 |        | Depth 82 km      |              |    |    |
|                     | eSSS                    | 00           | 47 | 35 | 24     | eLR              | 08           | 30 | 06 |
|                     | eLQ                     | 00           | 52 | 27 |        | Fiji             |              |    |    |
|                     | eLR (SSE)               | 00           | 57 | 07 | 24     | eLR              | 18           | 39 | 05 |
|                     | S. Sandwich Islands     |              |    |    |        |                  |              |    |    |
|                     | USCGS 00 08 33.3        |              |    |    | 24     | eLR              | 23           | 02 | 05 |
|                     | 60.4°S 33.4°W           | Dist. 106.1° |    |    |        | Chile            |              |    |    |
|                     | Depth 25 km             | Mag. 6.4-6.5 |    |    |        |                  |              |    |    |
|                     | Z 35, E 10, N 26        |              |    |    | 25     | eLR              | 00           | 18 | 35 |
| 23                  | eP                      | 08           | 41 | 37 | 25     | eLR              | 00           | 51 | 05 |
|                     | e(PP)                   | 08           | 43 | 15 |        |                  |              |    |    |
|                     | (continued)             |              |    |    |        |                  |              |    |    |

| Palisades, New York |                        |              |    | 13 |        |                      |              |    |    |
|---------------------|------------------------|--------------|----|----|--------|----------------------|--------------|----|----|
| Date                | Phase                  | h            | m  | s  | Date   | Phase                | h            | m  | s  |
| Oct 25              | eLR                    | 01           | 21 | 35 | Oct 26 | eLR                  | 12           | 15 | 35 |
|                     |                        |              |    |    |        | New Hebrides         |              |    |    |
| 25                  | eLR                    | 06           | 03 | 35 | 26     | ePKP                 | 15           | 46 | 29 |
|                     |                        |              |    |    |        | eFP                  | 15           | 49 | 17 |
| 25                  | eLR                    | 06           | 19 | 45 |        | ePP                  | 15           | 52 | 29 |
|                     |                        |              |    |    |        | eSKKS                | 15           | 56 | 13 |
| 25                  | eLR                    | 07           | 41 | 15 |        | eSKKS                | 15           | 56 | 29 |
|                     |                        |              |    |    |        | e                    | 15           | 57 | 01 |
| 25                  | eLR                    | 08           | 01 | 05 |        | e                    | 15           | 57 | 25 |
|                     |                        |              |    |    |        | eSKSP                | 15           | 59 | 33 |
| 25                  | eS                     | 09           | 10 | 45 |        | ePPS                 | 16           | 01 | 37 |
|                     | e                      | 09           | 11 | 41 |        | eSS                  | 16           | 07 | 57 |
|                     | eLR (S)                | 09           | 15 | 45 |        | e                    | 16           | 08 | 41 |
|                     | Off W. coast Peru      |              |    |    |        | eSSS                 | 16           | 13 | 41 |
|                     | USCGS 08 54 36.6       |              |    |    |        | eLQ                  | 16           | 28 | 05 |
|                     | 9.7°S 78.6°W           | Dist. 50.9°  |    |    |        | eLR (N)              | 16           | 36 | 25 |
|                     | Depth 110 km           |              |    |    |        | Off W. coast Sumatra |              |    |    |
| 25                  | eLR                    | 14           | 09 | 45 |        | USCGS 15 27 02.0     |              |    |    |
|                     |                        |              |    |    |        | 0.4°S 98.6°E         | Dist. 138.7° |    |    |
| 25                  | eSS                    | 14           | 55 | 05 |        | Depth 18 km          | Mag. 5.4     |    |    |
|                     | eLQ                    | 15           | 09 | 05 |        | Z 6, E 3, N 4        |              |    |    |
|                     | eLR (SW)               | 15           | 15 | 35 | 26     | ePKPPEP              | 20           | 15 | 45 |
|                     | Tonga Islands          |              |    |    |        | eLQ                  | 20           | 32 | 05 |
|                     | USCGS 14 20 20.8       |              |    |    |        | eLR (N)              | 20           | 41 | 25 |
|                     | 20.3°S 174.1°W         | Dist. 110.3° |    |    |        | Off W. coast Sumatra |              |    |    |
|                     | Depth 25 km            |              |    |    |        | USCGS 19 28 37.3     |              |    |    |
| 25                  | eLQ                    | 17           | 08 | 05 |        | 0.3°S 98.5°E         | Dist. 138.6° |    |    |
|                     | eLR (ENE)              | 17           | 15 | 05 |        | Depth 58 km          |              |    |    |
|                     | Gulf of Aden           |              |    |    | 27     | i                    | 15           | 32 | 51 |
| 25                  | i                      | 20           | 26 | 11 | 27     | i                    | 15           | 44 | 54 |
|                     | i                      | 20           | 26 | 16 |        |                      |              |    |    |
| 25                  | eLR (SW)               | 23           | 36 | 05 | 27     | i                    | 16           | 21 | 56 |
|                     | Tonga Islands          |              |    |    |        |                      |              |    |    |
| 26                  | ePP                    | 00           | 59 | 17 | 28     | eLR                  | 05           | 33 | 24 |
|                     | ePKS                   | 01           | 00 | 41 |        |                      |              |    |    |
|                     | ePPP                   | 01           | 02 | 17 |        | ePP                  | 06           | 21 | 34 |
|                     | eSKS                   | 01           | 04 | 41 |        | ePS                  | 06           | 31 | 12 |
|                     | eSKKS                  | 01           | 06 | 23 |        | eSS                  | 06           | 38 | 04 |
|                     | ePPS                   | 01           | 11 | 05 |        | eLQ                  | 06           | 51 | 04 |
|                     | e                      | 01           | 11 | 45 |        | eLR (SW)             | 06           | 55 | 34 |
|                     | eSS                    | 01           | 16 | 25 |        | Santa Cruz Islands   |              |    |    |
|                     | e                      | 01           | 19 | 11 |        | USCGS 06 00 33.7     |              |    |    |
|                     | eSSS                   | 01           | 24 | 43 |        | 11.6°S 166.4°E       | Dist. 120.4° |    |    |
|                     | eLQ                    | 01           | 30 | 21 |        | Depth 34 km          |              |    |    |
|                     | eLR (WNW)              | 01           | 37 | 25 |        | --, E 1, N 1         |              |    |    |
|                     | eLQ <sub>2</sub>       | 02           | 16 | 49 | 28     | eLR                  | 08           | 00 | 04 |
|                     | eLR <sub>2</sub> (ESE) | 02           | 28 | 29 |        |                      |              |    |    |
|                     | Bismarck Sea           |              |    |    | 28     | eLR                  | 11           | 26 | 04 |
|                     | USCGS 00 38 20.3       |              |    |    |        | Iran                 |              |    |    |
|                     | 3.1°S 147.4°E          | Dist. 127.2° |    |    |        |                      |              |    |    |
|                     | Depth 14 km            | Mag. 6       |    |    | 28     | eLR (SW)             | 13           | 17 | 24 |
|                     | Z 16, E 6, N 10        |              |    |    |        |                      |              |    |    |
| 26                  | eS                     | 08           | 38 | 17 | 28     | eSSS                 | 15           | 21 | 04 |
|                     | ePPS                   | 08           | 39 | 05 |        | eLR                  | 15           | 30 | 04 |
|                     | e                      | 08           | 49 | 25 |        | Near coast Chile     |              |    |    |
|                     | eLR (SE)               | 08           | 52 | 25 |        | USCGS 14 49 13.6     |              |    |    |
|                     | Off coast Chile        |              |    |    |        | 38.7°S 73.3°W        | Dist. 79.6°  |    |    |
|                     | USCGS 08 16 03.4       |              |    |    |        | Depth 43 km          |              |    |    |
|                     | 37.9°S 73.4°W          | Dist. 78.6°  |    |    | 28     | e                    | 17           | 59 | 24 |
|                     | Depth 55 km            |              |    |    |        | e                    | 17           | 59 | 47 |









| Palisades, New York |                        |              |    | 18 |        |                   |   | 1961 |    |  |  |
|---------------------|------------------------|--------------|----|----|--------|-------------------|---|------|----|--|--|
| Date                | Phase                  | h            | m  | s  | Date   | Phase             | h   | m    | s  |  |  |
| Nov 16              | eLR                    | 08           | 29 | 24 | Nov 19 | Continued         |   |      |    |  |  |
|                     |                        |              |    |    |        | eLR               | 08  | 29   | 30 |  |  |
| 16                  | eLR                    | 10           | 46 | 34 |        | W. of Galapagos   |   |      |    |  |  |
|                     |                        |              |    |    |        | USCGS 08 05 07.4  |   |      |    |  |  |
| 16                  | e                      | 12           | 24 | 44 |        | 4.3°S 101.7°W     | Dist. 51.6°   |      |    |  |  |
|                     | e                      | 12           | 31 | 14 |        | Depth 25 km       |   |      |    |  |  |
|                     | eLR (E)                | 12           | 34 | 24 | 19     | eLR               | 10  | 51   | 05 |  |  |
| 16                  | ePS                    | 16           | 34 | 12 |        | Solomon Islands   |   |      |    |  |  |
|                     | eSS                    | 16           | 40 | 44 | 19     | eLR               | 11  | 08   | 20 |  |  |
|                     | ePKPKP                 | 16           | 41 | 12 |        |                   |   |      |    |  |  |
|                     | eSSS                   | 16           | 46 | 20 | 19     | eLR               | 17  | 51   | 15 |  |  |
|                     | eLQ                    | 16           | 54 | 44 |        |                   |   |      |    |  |  |
|                     | eLR (WSW)              | 17           | 00 | 24 | 19     | eLR               | 21  | 28   | 40 |  |  |
|                     | eLR <sub>2</sub>       | 17           | 55 | 24 |        |                   |   |      |    |  |  |
|                     | Loyalty Islands region |              |    |    | 19     | eLR               | 22  | 46   | 35 |  |  |
|                     | USCGS 16 03 54.8       |              |    |    |        |                   |   |      |    |  |  |
|                     | 20.2°S 172.9°E         | Dist. 120.0° |    |    | 19     | iPKS              | 23  | 44   | 12 |  |  |
|                     | Depth 32 km            |              |    |    |        | ePS               | 23  | 53   | 26 |  |  |
| 17                  | eLR                    | 10           | 06 | 44 |        | ePPS              | 23  | 55   | 24 |  |  |
|                     |                        |              |    |    | 20     | eSSFKP            | 23  | 56   | 40 |  |  |
| 17                  | eLR                    | 11           | 44 | 04 |        | eSS               | 00  | 01   | 18 |  |  |
|                     |                        |              |    |    |        | e                 | 00  | 02   | 24 |  |  |
| 17                  | e                      | 12           | 21 | 44 |        | e                 | 00  | 03   | 11 |  |  |
|                     | e                      | 12           | 28 | 44 |        | e                 | 00  | 04   | 35 |  |  |
|                     | e                      | 12           | 33 | 34 |        | e                 | 00  | 13   | 54 |  |  |
|                     | eLQ                    | 12           | 40 | 04 |        | N. Celebes        |   |      |    |  |  |
|                     | eLR                    | 12           | 43 | 44 |        | USCGS 23 21 55.5  | Dist. 135.1°  |      |    |  |  |
|                     |                        |              |    |    |        | 0.8°N 124.3°E     |   |      |    |  |  |
|                     |                        |              |    |    |        | Depth 157 km      |   |      |    |  |  |
| 18                  | eLQ                    | 04           | 34 | 14 | 20     | eLR               | 03  | 40   | 15 |  |  |
|                     | Romania                |              |    |    |        |                   |   |      |    |  |  |
| 18                  | ePKS                   | 06           | 25 | 22 | 20     | eLR               | 04  | 47   | 05 |  |  |
|                     | eSS                    | 06           | 42 | 24 |        | Outer Mongolia    |   |      |    |  |  |
|                     | eSSS                   | 06           | 47 | 26 |        |                   |   |      |    |  |  |
|                     | eSSSS                  | 06           | 50 | 29 | 20     | eLR               | 07  | 21   | 50 |  |  |
|                     | eLQ                    | 06           | 59 | 25 |        | Kamchatka         |   |      |    |  |  |
|                     | eLR (NNW)              | 07           | 05 | 40 |        |                   |   |      |    |  |  |
|                     | Halmahera region       |              |    |    | 20     | ePP               | 12  | 04   | 54 |  |  |
|                     | USCGS 06 02 34.3       |              |    |    |        | ePKS              | 12  | 06   | 28 |  |  |
|                     | 0.9°S 126.9°E          | Dist 135.9°  |    |    |        | iPPS              | 12  | 16   | 24 |  |  |
|                     | Depth 38 km            |              |    |    |        | ePKKS             | 12  | 17   | 15 |  |  |
| 18                  | eLR                    | 11           | 46 | 15 |        | eSS               | 12  | 22   | 14 |  |  |
|                     | Peru                   |              |    |    |        | eSKKKS            | 12  | 25   | 18 |  |  |
|                     |                        |              |    |    |        | eSSS              | 12  | 30   | 39 |  |  |
| 18                  | e                      | 11           | 52 | 44 |        | eLQ               | 12  | 36   | 10 |  |  |
|                     | eL                     | 12           | 04 | 15 |        | eLR (W)           | 12  | 42   | 00 |  |  |
|                     | eLR (WNW)              | 12           | 12 | 55 |        | Loyalty Islands   |   |      |    |  |  |
|                     |                        |              |    |    |        | USCGS 11 44 19.4  |   |      |    |  |  |
| 18                  | e(LQ)                  | 23           | 00 | 50 |        | 21.8°S 169.9°E    | Dist. 123.5°  |      |    |  |  |
|                     | eLR                    | 23           | 08 | 45 |        | Depth 33 km       | Mag. 5 <sup>1</sup> / <sub>2</sub> -5 <sup>3</sup> / <sub>4</sub> |      |    |  |  |
|                     | Near coast Formosa     |              |    |    |        | Z 9, E 4, N 2     |   |      |    |  |  |
| 19                  | eLR                    | 01           | 09 | 50 | 20     | iP                | 18  | 04   | 17 |  |  |
|                     | Aleutians              |              |    |    |        | ePP               | 18  | 04   | 54 |  |  |
|                     |                        |              |    |    |        | e                 | 18  | 07   | 14 |  |  |
|                     |                        |              |    |    |        | iS                | 18  | 09   | 07 |  |  |
|                     |                        |              |    |    |        | eLR (ESE)         | 18  | 10   | 55 |  |  |
| 19                  | eLR                    | 04           | 35 | 40 |        | N. Atlantic Ocean |   |      |    |  |  |
|                     | New Hebrides           |              |    |    |        | USCGS 17 58 17.5  |   |      |    |  |  |
|                     |                        |              |    |    |        | 31.3°N 40.9°W     | Dist. 28.3°   |      |    |  |  |
|                     |                        |              |    |    |        | Depth 44 km       | Mag. 5-5 <sup>1</sup> / <sub>4</sub>                              |      |    |  |  |
|                     |                        |              |    |    |        | Z 36, E 12, N 10  |   |      |    |  |  |
| 19                  | ePS                    | 08           | 21 | 40 | 20     | eLR               | 20  | 40   | 45 |  |  |
|                     | eLQ                    | 08           | 25 | 15 |        | New Guinea        |   |      |    |  |  |
|                     | (continued)            |              |    |    |        |                   |   |      |    |  |  |

| Palisades, New York |                             |              |    | 19 |        |                   |              | 1961 |    |  |  |
|---------------------|-----------------------------|--------------|----|----|--------|-------------------|--------------|------|----|--|--|
| Date                | Phase                       | h            | m  | s  | Date   | Phase             | h            | m    | s  |  |  |
| Nov 21              | eLR                         | 01           | 12 | 05 | Nov 25 | eLQ               | 21           | 08   | 06 |  |  |
|                     |                             |              |    |    |        | eLR               | 21           | 10   | 06 |  |  |
| 21                  | eLR                         | 06           | 52 | 05 |        | Honshu, Japan     |              |      |    |  |  |
|                     | Venezuela                   |              |    |    | 25     | eLR               | 22           | 48   | 06 |  |  |
| 21                  | eLR                         | 08           | 10 | 15 |        |                   |              |      |    |  |  |
|                     | Windward Islands            |              |    |    | 25     | eLR               | 23           | 50   | 26 |  |  |
|                     |                             |              |    |    |        | Tonga Islands     |              |      |    |  |  |
| 21                  | eLR                         | 12           | 11 | 35 |        |                   |              |      |    |  |  |
|                     | N. Celebes                  |              |    |    | 26     | eLR               | 10           | 11   | 16 |  |  |
| 22                  | eLR                         | 03           | 42 | 25 |        |                   |              |      |    |  |  |
|                     | New Hebrides                |              |    |    | 26     | eLR               | 10           | 19   | 36 |  |  |
|                     |                             |              |    |    |        |                   |              |      |    |  |  |
| 22                  | eLR                         | 12           | 09 | 25 |        | 26 eLR (SE)       | 14           | 30   | 56 |  |  |
|                     | Loyalty Islands             |              |    |    |        | N. Atlantic Ocean |              |      |    |  |  |
|                     |                             |              |    |    |        | USCGS 14 17 50.5  |              |      |    |  |  |
|                     |                             |              |    |    |        | 30.7°N 44.1°W     | Dist. 26°    |      |    |  |  |
|                     |                             |              |    |    |        | Depth 39 km       |              |      |    |  |  |
| 22                  | eLR                         | 13           | 20 | 05 |        |                   |              |      |    |  |  |
|                     | S. of Panama                |              |    |    | 26     | eLR               | 20           | 08   | 26 |  |  |
| 22                  | eLR                         | 18           | 47 | 05 |        |                   |              |      |    |  |  |
|                     |                             |              |    |    | 26     | eLR               | 21           | 49   | 06 |  |  |
| 22                  | eLR                         | 19           | 02 | 05 |        |                   |              |      |    |  |  |
|                     |                             |              |    |    | 26     | eLR               | 23           | 40   | 06 |  |  |
| 22                  | ePS                         | 21           | 09 | 02 |        |                   |              |      |    |  |  |
|                     | eSS                         | 21           | 15 | 38 | 27     | eLR               | 01           | 22   | 06 |  |  |
|                     | e                           | 21           | 26 | 24 |        |                   |              |      |    |  |  |
|                     | eLQ                         | 21           | 29 | 04 |        | Colorado          |              |      |    |  |  |
|                     | eLR (W)                     | 21           | 35 | 12 |        | USCGS 00 55 44.3  |              |      |    |  |  |
|                     | Kermadec Islands            |              |    |    |        | 38.9°N 106.1°W    |              |      |    |  |  |
|                     | USCGS 20 39 18.6            |              |    |    |        | Depth 19 km       |              |      |    |  |  |
|                     | 26.8°S 176.6°W              | Dist. 116.6° |    |    | 27     | eLR               | 02           | 38   | 06 |  |  |
|                     | Depth 77 km                 |              |    |    |        | Sandwich Islands  |              |      |    |  |  |
| 22                  | eLR                         | 22           | 42 | 04 |        |                   |              |      |    |  |  |
|                     |                             |              |    |    | 27     | eP                | 06           | 11   | 26 |  |  |
| 23                  | eLR                         | 06           | 55 | 24 |        | ePP               | 06           | 15   | 36 |  |  |
|                     | Kermadec                    |              |    |    |        | eSKS              | 06           | 23   | 06 |  |  |
|                     |                             |              |    |    |        | eSS               | 06           | 30   | 36 |  |  |
|                     |                             |              |    |    |        | eSSS              | 06           | 35   | 46 |  |  |
| 23                  | e(P)                        | 10           | 42 | 12 |        | eLQ               | 06           | 44   | 06 |  |  |
|                     | eLR                         | 10           | 49 | 28 |        | eLR N(E)          | 06           | 47   | 26 |  |  |
|                     | Costa Rica-Nicaragua border |              |    |    |        | Kyushu, Japan     |              |      |    |  |  |
|                     | USCGS 10 36 11.0            |              |    |    |        | USCGS 05 57 07.6  |              |      |    |  |  |
|                     | 11.1°N 84.7°W               | Dist. 31.4°  |    |    |        | 31.6°N 131.1°E    | Dist. 103.8° |      |    |  |  |
|                     | Depth 234 km                |              |    |    |        | Depth 25 km       |              |      |    |  |  |
| 23                  | eLR                         | 16           | 15 | 05 |        |                   |              |      |    |  |  |
|                     | Tonga Islands region        |              |    |    | 27     | eLR               | 10           | 35   | 06 |  |  |
| 23                  | eLR                         | 17           | 47 | 25 |        |                   |              |      |    |  |  |
|                     | Tonga Islands               |              |    |    | 27     | eLR               | 12           | 21   | 06 |  |  |
| 23                  | eLR                         | 18           | 13 | 05 |        |                   |              |      |    |  |  |
|                     |                             |              |    |    | 27     | ePKP              | 17           | 29   | 35 |  |  |
|                     |                             |              |    |    |        | ePP               | 17           | 32   | 35 |  |  |
|                     |                             |              |    |    |        | ePKS              | 17           | 33   | 25 |  |  |
|                     |                             |              |    |    |        | ePKS              | 17           | 33   | 47 |  |  |
|                     |                             |              |    |    |        | ePPP              | 17           | 34   | 57 |  |  |
|                     |                             |              |    |    |        | eSKS              | 17           | 36   | 11 |  |  |
|                     |                             |              |    |    |        | eSKKS             | 17           | 39   | 27 |  |  |
|                     |                             |              |    |    |        | ePPS              | 17           | 44   | 43 |  |  |
|                     |                             |              |    |    |        | eSKKS             | 17           | 45   | 37 |  |  |
|                     |                             |              |    |    |        | eSS               | 17           | 50   | 37 |  |  |
|                     |                             |              |    |    |        | eLQ               | 18           | 07   | 07 |  |  |
|                     |                             |              |    |    |        | eLR (NW)          | 18           | 15   | 47 |  |  |
| 25                  | eLR                         | 15           | 10 | 06 |        | Halmahera         |              |      |    |  |  |
|                     | Solomon Islands             |              |    |    |        | USCGS 17 10 33.3  |              |      |    |  |  |
|                     |                             |              |    |    |        | 0.6°S 127.1°E     | Dist. 135.9° |      |    |  |  |
| 25                  | eLR                         | 16           | 06 | 26 |        | Depth 25 km       |              |      |    |  |  |

| Palisades, New York |                       |              | 20    |                  |              | 1961 |       |       |
|---------------------|-----------------------|--------------|-------|------------------|--------------|------|-------|-------|
| Date                | Phase                 | h m s        | Date  | Phase            | h m s        | Date | Phase | h m s |
| Nov 28              | eLR                   | 00 35 27     | Dec 1 | Continued        | 21 35 28     |      |       |       |
|                     | Balleny Islands       |              |       | ePKS             | 21 37 34     |      |       |       |
| 28                  | eLR                   | 04 25 07     |       | eSKS             | 21 39 06     |      |       |       |
| 28                  | eLR                   | 05 52 07     |       | ePS              | 21 40 56     |      |       |       |
|                     | S. of Halmahera       |              |       | eFPS             | 21 42 10     |      |       |       |
| 28                  | eLR                   | 08 51 07     |       | eSS              | 21 47 10     |      |       |       |
|                     | Kurile Islands        |              |       | eSSS             | 21 54 54     |      |       |       |
| 28                  | eLR                   | 09 27 37     |       | eLQ              | 21 57 40     |      |       |       |
|                     | Greece-Turkey border  |              |       | eLR (N)          | 22 05 10     |      |       |       |
| 28                  | eLR                   | 11 12 07     |       | East China Sea   |              |      |       |       |
|                     | India-Pakistan border |              |       | USCGS 21 13 04.1 |              |      |       |       |
| 28                  | e                     | 19 46 20     |       | 26.5°N 124.9°E   | Dist. 110.1° |      |       |       |
|                     | S. of Tasmania        |              |       | Depth 206 km     |              |      |       |       |
|                     | USCGS 18 34 37.4      |              |       | 2 e              | 05 00 30     |      |       |       |
|                     | 56.9°S 143.5°E        | Dist. 150.9° |       | eLR              | 05 03 10     |      |       |       |
|                     | Depth 51 km           |              |       | 2 e              | 05 16 40     |      |       |       |
| 29                  | eSKS                  | 09 51 56     |       | eLR              | 05 22 30     |      |       |       |
|                     | eSKKS                 | 09 52 24     |       | 2 e              | 07 33 22     |      |       |       |
|                     | ePS                   | 09 53 36     |       | eLQ              | 07 35 30     |      |       |       |
|                     | eFPS                  | 09 54 20     |       | eLR              | 07 37 40     |      |       |       |
|                     | eSS                   | 09 57 58     |       | 2 eS             | 12 59 10     |      |       |       |
|                     | ePKS                  | 10 02 00     |       | eSS              | 13 03 30     |      |       |       |
|                     | eSKS                  | 10 05 32     |       | eLQ              | 13 06 10     |      |       |       |
|                     | eLQ                   | 10 06 58     |       | eLR (NE)         | 13 09 10     |      |       |       |
|                     | eLR                   | 10 10 28     |       | N. Tunisia       |              |      |       |       |
|                     | S. Atlantic           |              |       | USCGS 12 40 17.8 | Dist. 62.2°  |      |       |       |
|                     | USCGS 09 28 12.7      |              |       | 36.5°N 8.6°E     |              |      |       |       |
|                     | 38.3°S 19.4°W         | Dist. 93.3°  |       | Depth 62 km      |              |      |       |       |
|                     | Depth 25 km           |              |       | 2 eLR            | 16 11 31     |      |       |       |
| 29                  | eP                    | 18 02 02     |       | 2 eLR            | 18 08 11     |      |       |       |
|                     | Kamchatka             |              |       | 2 i              | 18 10 32     |      |       |       |
|                     | USCGS 17 50 05.6      |              |       | i                | 18 10 57     |      |       |       |
|                     | 52.2°N 158.4°E        | Dist. 76.9°  |       | 2 e              | 19 35 31     |      |       |       |
|                     | Depth 76 km           |              |       | e                | 19 36 51     |      |       |       |
| 29                  | eLR                   | 21 04 08     |       | e                | 19 40 21     |      |       |       |
|                     | N. Central Peru       |              |       | eLR (W)          | 19 42 59     |      |       |       |
| 29                  | eLR                   | 23 02 08     |       | 3 eP             | 01 07 03     |      |       |       |
|                     | New Hebrides          |              |       | epP              | 01 07 11     |      |       |       |
| 30                  | eLR                   | 11 01 28     |       | ePP              | 01 08 11     |      |       |       |
|                     |                       |              |       | eS               | 01 12 25     |      |       |       |
| 30                  | eLR                   | 11 39 08     |       | eLR (SW)         | 01 15 41     |      |       |       |
|                     |                       |              |       | Guerrero, Mexico |              |      |       |       |
| 30                  | eLR                   | 22 53 50     |       | USCGS 01 00 35.2 | Dist. 31.5°  |      |       |       |
|                     | Molucca Passage       |              |       | 17.9°N 99.3°W    |              |      |       |       |
|                     |                       |              |       | Depth 31 km      |              |      |       |       |
| Dec 1               | eLR (NW)              | 08 09 10     |       | 3 eLR            | 03 46 11     |      |       |       |
|                     | Kamchatka             |              |       | 3 eLR            | 04 55 41     |      |       |       |
| 1                   | eLR                   | 09 07 30     |       | 3 eLQ            | 08 02 11     |      |       |       |
| 1                   | ePKP                  | 21 31 54     |       | eLR              | 08 04 31     |      |       |       |
|                     | ePP                   | 21 32 46     |       | 3 eLR            | 09 08 51     |      |       |       |
|                     | epPP                  | 21 33 10     |       | Formosa          |              |      |       |       |
|                     | (continued)           |              |       |                  |              |      |       |       |

| Palisades, New York |                          |              | 21    |                          |              | 1961 |       |       |
|---------------------|--------------------------|--------------|-------|--------------------------|--------------|------|-------|-------|
| Date                | Phase                    | h m s        | Date  | Phase                    | h m s        | Date | Phase | h m s |
| Dec 3               | e                        | 09 24 12     | Dec 4 | eLR (NE)                 | 13 29 34     |      |       |       |
|                     | e                        | 09 30 52     |       | (cont.) Tibet            |              |      |       |       |
|                     | eLQ                      | 09 34 32     |       | USCGS 12 38 11.9         |              |      |       |       |
|                     | eLR                      | 09 36 42     |       | 33.2°N 95.3°E            | Dist. 105.6° |      |       |       |
| 3                   | eLR                      | 10 09 12     |       | Depth 45 km              |              |      |       |       |
|                     | Kirghiz SSR              |              |       | 4 eLQ                    | 17 58 04     |      |       |       |
| 3                   | eLR                      | 10 23 42     |       | eLR                      | 18 00 34     |      |       |       |
| 3                   | eLR                      | 10 53 52     |       | 5 ePKKP                  | 13 30 36     |      |       |       |
| 3                   | eLR                      | 11 34 12     |       | eSS                      | 13 38 26     |      |       |       |
| 3                   | ePP                      | 16 34 47     |       | New Hebrides             |              |      |       |       |
|                     | ePS                      | 16 44 39     |       | USCGS 13 02 31.9         |              |      |       |       |
|                     | eSS                      | 16 51 13     |       | 16.0°S 168.1°E           | Dist. 121.4° |      |       |       |
|                     | e                        | 16 55 33     |       | Depth 145 km             |              |      |       |       |
|                     | e                        | 16 59 13     |       | 5 eSKKS                  | 13 31 52     |      |       |       |
|                     | eLQ                      | 17 04 43     |       | eSKSP                    | 13 40 22     |      |       |       |
|                     | eLR (NW)                 | 17 11 13     |       | eSS                      | 13 44 42     |      |       |       |
|                     | Santa Cruz Islands       |              |       | eLR                      | 14 13 44     |      |       |       |
|                     | USCGS 16 14 31.4         |              |       | S.W. of Tasmania         |              |      |       |       |
|                     | 11.6°S 166.1°E           | Dist. 120.4° |       | USCGS 13 01 04.7         |              |      |       |       |
|                     | Depth 122 km             |              |       | 50.8°S 139.8°E           | Dist. 154.6° |      |       |       |
| 3                   | eLR                      | 18 14 53     |       | Depth 64 km              |              |      |       |       |
| 3                   | eLQ                      | 19 08 43     |       | 5 eLR                    | 21 34 14     |      |       |       |
|                     | eLR                      | 19 15 13     |       | 6 eLR                    | 01 10 14     |      |       |       |
|                     | Armenia SSR              |              |       | 6 eLQ                    | 03 09 34     |      |       |       |
| 3                   | eLR                      | 21 45 13     |       | eLR                      | 03 14 26     |      |       |       |
|                     | New Guinea               |              |       | Honshu, Japan            |              |      |       |       |
| 4                   | eSS                      | 06 11 43     |       | 6 eLQ                    | 03 57 54     |      |       |       |
|                     | eSSS                     | 06 20 33     |       | eLR                      | 04 01 14     |      |       |       |
|                     | eLQ                      | 06 27 33     |       | 6 ePP                    | 06 09 44     |      |       |       |
|                     | eLR (NW)                 | 06 33 33     |       | e                        | 06 13 34     |      |       |       |
|                     | New Britain              |              |       | ePPS                     | 06 21 14     |      |       |       |
|                     | USCGS 05 33 18.5         |              |       | eSS                      | 06 26 26     |      |       |       |
|                     | 5.2°S 151.6°E            | Dist. 125.5° |       | eLQ                      | 06 40 42     |      |       |       |
|                     | Depth 59 km              |              |       | eLR (N)                  | 06 46 14     |      |       |       |
| 4                   | e(P)                     | 07 41 36     |       | Andaman Islands          |              |      |       |       |
|                     | e                        | 07 41 47     |       | USCGS 05 48 39.3         |              |      |       |       |
|                     | e(S)                     | 07 45 27     |       | 13.7°N 93.6°E            | Dist. 124.1° |      |       |       |
|                     | S. of Dominican Republic |              |       | Depth 53 km              | Mag. 5.4     |      |       |       |
|                     | USCGS 07 36 26.0         |              |       | 6 ePP                    | 13 55 38     |      |       |       |
|                     | 18.9°N 68.8°W            | Dist. 22.3°  |       | eSKS                     | 14 01 24     |      |       |       |
|                     | Depth 164 km             |              |       | eSKKS                    | 14 03 14     |      |       |       |
| 4                   | eLR                      | 08 48 53     |       | ePKKP                    | 14 05 14     |      |       |       |
|                     | Kamchatka                |              |       | eLQ                      | 14 22 44     |      |       |       |
| 4                   | eLR                      | 09 29 13     |       | eLR (SW)                 | 14 30 14     |      |       |       |
| 4                   | eLQ                      | 10 46 33     |       | Tonga Islands            |              |      |       |       |
|                     | eLR                      | 10 47 53     |       | USCGS 13 35 43.8         |              |      |       |       |
| 4                   | eSKS                     | 13 03 14     |       | 23.5°S 176.0°            | Dist. 120.1° |      |       |       |
|                     | ePS                      | 13 06 14     |       | Depth 18 km              |              |      |       |       |
|                     | eSS                      | 13 12 34     |       | 6 eP                     | 16 51 43     |      |       |       |
|                     | ePKPPKP                  | 13 16 44     |       | P (Z) 8 sec 2.5 mic comp |              |      |       |       |
|                     | e                        | 13 21 44     |       | ePcP                     | 16 51 57     |      |       |       |
|                     | eLQ                      | 13 24 14     |       | ePP                      | 16 54 47     |      |       |       |
|                     | (continued)              |              |       | eS                       | 17 01 42     |      |       |       |
|                     |                          |              |       | eScS                     | 17 01 58     |      |       |       |
|                     |                          |              |       | ePPS                     | 17 02 29     |      |       |       |
|                     |                          |              |       | eSS                      | 17 06 58     |      |       |       |
|                     |                          |              |       | eLQ                      | 17 14 54     |      |       |       |
|                     |                          |              |       | (continued)              |              |      |       |       |



| Palisades, New York   |                  |             | 22                     |                   |             | 1961 |  |  |
|-----------------------|------------------|-------------|------------------------|-------------------|-------------|------|--|--|
| Date                  | Phase            | h m s       | Date                   | Phase             | h m s       |      |  |  |
| Dec 6                 | Continued        | 17 17 46    | Dec 9                  | Continued         |             |      |  |  |
|                       | eLR (NW)         |             |                        | USCGS 03 58 55.4  |             |      |  |  |
|                       | Kurile Islands   |             |                        | 14.9°S 75.7°W     | Dist. 55.7° |      |  |  |
|                       | USCGS 16 39 31.5 |             |                        | Depth 39 km       | Mag. 5      |      |  |  |
|                       | 49.4°N 155.2°E   | Dist. 80.5° |                        | Z 4.5, E 1.5, N 4 |             |      |  |  |
|                       | Depth 22 km      | Mag. 5.6    |                        |                   |             |      |  |  |
|                       | * Z 10, E 9, N 7 |             |                        |                   |             |      |  |  |
| 7 e                   |                  | 01 05 14    | 9 eP                   |                   | 11 30 42    |      |  |  |
| eLQ                   |                  | 01 09 34    | ePcP                   |                   | 11 30 52    |      |  |  |
| eLR (SW)              |                  | 01 14 14    | e                      |                   | 11 40 59    |      |  |  |
| Tonga Islands         |                  |             | eS                     |                   | 11 41 15    |      |  |  |
| 7 eLR                 |                  | 06 48 14    | ePS                    |                   | 11 41 59    |      |  |  |
| 7 eLR                 |                  | 10 14 14    | eSS                    |                   | 11 46 47    |      |  |  |
| Solomon Islands       |                  |             | eLQ                    |                   | 11 52 53    |      |  |  |
| 7 eLR                 |                  | 17 26 55    | eLR (SSE)              |                   | 11 58 15    |      |  |  |
| Tonga Islands         |                  |             | S. Chile               |                   |             |      |  |  |
| 8 eLR                 |                  | 04 44 15    | USCGS 11 18 08.9       |                   |             |      |  |  |
| Tonga Islands         |                  |             | 43.7°S 75.2°W          | Dist. 84.6°       |             |      |  |  |
| 8 eLR                 |                  | 07 06 35    | Depth 34 km            | Mag. 5.6          |             |      |  |  |
| New Guinea            |                  |             | Z 21, E 9, N 11        |                   |             |      |  |  |
| 8 eLR                 |                  | 08 02 15    | 9 eLR                  |                   | 18 02 16    |      |  |  |
| New Guinea            |                  |             | 9 ePKS                 |                   | 20 11 36    |      |  |  |
| 8 eLR                 |                  | 10 35 45    | eLR                    |                   | 20 17 36    |      |  |  |
| New Guinea            |                  |             | Fiji Islands           |                   |             |      |  |  |
| 8 e                   |                  | 11 24 27    | USCGS 19 49 41.3       |                   |             |      |  |  |
| eLR                   |                  | 11 34 45    | 21.7°S 179.9°E         | Dist. 115.9°      |             |      |  |  |
| Gulf of Aden          |                  |             | Depth 620 km           |                   |             |      |  |  |
| USCGS 10 40 23.2      | Dist. 106.9°     |             | 9 eLR                  |                   | 21 50 46    |      |  |  |
| 11.4°N 49.7°E         |                  |             | Kodiak Island region   |                   |             |      |  |  |
| Depth 25 km           |                  |             | 9 eLR                  |                   | 22 37 16    |      |  |  |
| 8 eLR                 |                  | 15 26 45    | Tonga Islands region   |                   |             |      |  |  |
| New Hebrides          |                  |             | 9 eLR                  |                   | 23 39 56    |      |  |  |
| 8 eLR                 |                  | 18 59 35    | New Britain            |                   |             |      |  |  |
| 8 eLR                 |                  | 20 40 15    | 10 eLQ                 |                   | 00 15 46    |      |  |  |
| 9 eP                  |                  | 02 24 35    | eLR                    |                   | 00 17 26    |      |  |  |
| epP                   |                  | 02 25 00    | 10 eLR                 |                   | 01 56 36    |      |  |  |
| ePP                   |                  | 02 25 51    | 10 eLR                 |                   | 05 24 16    |      |  |  |
| eS                    |                  | 02 31 59    | eLR                    |                   | 09 21 36    |      |  |  |
| eSS                   |                  | 02 35 23    | eLR                    |                   | 09 21 36    |      |  |  |
| eLQ                   |                  | 02 37 55    | 10 eLR                 |                   | 17 45 16    |      |  |  |
| eLR (NW)              |                  | 02 40 15    | Tonga Islands region   |                   |             |      |  |  |
| Kodiak Island, Alaska |                  |             | 10 eP                  |                   | 19 05 32    |      |  |  |
| USCGS 02 15 22.0      | Dist. 52.1°      |             | e                      |                   | 19 06 30    |      |  |  |
| 56.3°N 153.9°W        | Mag. 5.2         |             | e                      |                   | 19 13 14    |      |  |  |
| Depth 31 km           |                  |             | eLg                    |                   | 19 13 33    |      |  |  |
| Z 13, E 9, N 9        |                  |             | Carlsbad, New Mexico   |                   |             |      |  |  |
| 9 eP                  |                  | 04 08 30    | USCGS 19 00 00         |                   |             |      |  |  |
| eS                    |                  | 04 16 19    | 32°15'49"N 103°51'57"W |                   |             |      |  |  |
| e(ScS)                |                  | 04 18 37    | Dist. 25.75°, 2860 km  |                   |             |      |  |  |
| eSS                   |                  | 04 20 23    | Depth 1184 ft, 5 kt    |                   |             |      |  |  |
| eLQ                   |                  | 04 22 23    | 10 eLR                 |                   | 20 51 46    |      |  |  |
| eLR (SE)              |                  | 04 25 45    | 10 eLR                 |                   | 23 04 56    |      |  |  |
| Off coast Peru        |                  |             | 10 eLR                 |                   | 23 35 16    |      |  |  |

(continued)

| Palisades, New York       |              |          | 23                       |                           |             | 1961 |  |  |
|---------------------------|--------------|----------|--------------------------|---------------------------|-------------|------|--|--|
| Date                      | Phase        | h m s    | Date                     | Phase                     | h m s       |      |  |  |
| Dec 11                    | eLR          | 05 03 36 | Dec 14                   | Continued                 |             |      |  |  |
| 11 eLR                    |              | 15 40 46 |                          | eLR (W)                   | 01 56 36    |      |  |  |
| Near coast S. Chile       |              |          |                          | S. coast Baja. California |             |      |  |  |
| 11 eLR                    |              | 16 27 56 |                          | USCGS 01 40 24.7          |             |      |  |  |
| 12 eLR                    |              | 00 51 16 |                          | 21.2°N 109.0°W            | Dist. 35.8° |      |  |  |
| 12 e                      |              | 04 57 46 |                          | Depth 60 km               |             |      |  |  |
| eLQ                       |              | 05 01 36 | 14 eLR                   |                           | 02 33 16    |      |  |  |
| eLR                       |              | 05 04 16 | 14 ePKS                  |                           | 07 33 00    |      |  |  |
| Banda Sea                 |              |          | ePS                      |                           | 07 42 24    |      |  |  |
| 12 eLR                    |              | 11 20 36 | eScSPKP                  |                           | 07 44 48    |      |  |  |
| 12 eSS                    |              | 17 57 15 | eSKKKS                   |                           | 07 48 56    |      |  |  |
| eLQ                       |              | 18 11 55 | eSS                      |                           | 07 49 56    |      |  |  |
| eLR                       |              | 18 17 35 | eSKSSKS                  |                           | 07 51 48    |      |  |  |
| N. Mariana Islands        |              |          | e(SSSS)                  |                           | 08 10 36    |      |  |  |
| USCGS 17 23 04.0          | Dist. 107.2° |          | eLR (NW)                 |                           | 08 11 36    |      |  |  |
| 21.7°N 146.0°E            |              |          | Near N. coast New Guinea |                           |             |      |  |  |
| Depth 24 km               |              |          | USCGS 07 10 23.2         |                           |             |      |  |  |
| 12 i                      |              | 18 25 17 | 3.1°S 140.9°E            | Dist. 130.8°              |             |      |  |  |
| 12 i                      |              | 20 25 34 | Depth 44 km              |                           |             |      |  |  |
| i                         |              | 20 25 53 | 14 eLR (SW)              |                           | 09 28 16    |      |  |  |
| 12 i                      |              | 21 11 45 | 14 eLR                   |                           | 10 56 36    |      |  |  |
| 12 eS                     |              | 22 27 35 | 14 eLR                   |                           | 11 31 16    |      |  |  |
| eLQ                       |              | 22 29 45 | 14 eLQ                   |                           | 12 10 16    |      |  |  |
| eLR                       |              | 22 32 15 | eLR                      |                           | 12 15 46    |      |  |  |
| Revilla Gigedo Islands    |              |          | 14 eLR                   |                           | 13 30 16    |      |  |  |
| USCGS 22 14 36.3          | Dist. 36.4°  |          | Flores Sea               |                           |             |      |  |  |
| 18.9°N 107.6°W            |              |          | 14 eLR                   |                           | 19 45 46    |      |  |  |
| Depth 33 km               |              |          | Fiji Islands             |                           |             |      |  |  |
| 13 eLR                    |              | 06 03 15 | 15 eLR                   |                           | 13 22 16    |      |  |  |
| 13 eLR                    |              | 09 38 35 | New Guinea               |                           |             |      |  |  |
| Ryukyu Islands            |              |          | 15 eLR                   |                           | 14 28 16    |      |  |  |
| 13 e(SKS)                 |              | 11 45 35 | 15 i                     |                           | 17 14 38    |      |  |  |
| e(PPS)                    |              | 11 50 15 | 15 eL                    |                           | 19 41 16    |      |  |  |
| eSS                       |              | 11 54 15 | 15 eLR                   |                           | 23 13 46    |      |  |  |
| eLR                       |              | 12 03 15 | 16 eLR                   |                           | 04 21 16    |      |  |  |
| S. Chile-Argentina border |              |          | 16 eLR                   |                           | 10 14 16    |      |  |  |
| USCGS 11 23 28.9          | Dist. 91.6°  |          | Kermadec Islands         |                           |             |      |  |  |
| 50.9°S 73.0°W             |              |          | 16 eLR (NW)              |                           | 10 54 16    |      |  |  |
| Depth 82 km               |              |          | Tonga Islands            |                           |             |      |  |  |
| 13 i                      |              | 17 19 36 | 16 eLR                   |                           | 11 18 16    |      |  |  |
| 13 e                      |              | 17 27 16 | 16 eLR (NW)              |                           | 14 17 16    |      |  |  |
| eLR (NW)                  |              | 17 52 16 | Kamchatka                |                           |             |      |  |  |
| New Hebrides              |              |          | 16 e                     |                           | 19 30 53    |      |  |  |
| 13 i                      |              | 17 29 03 | e                        |                           | 19 31 17    |      |  |  |
| i                         |              | 17 29 06 | 16 e                     |                           | 19 32 49    |      |  |  |
| 14 e                      |              | 01 52 21 | e                        |                           | 19 33 11    |      |  |  |
| 14 eS                     |              | 01 53 06 |                          |                           |             |      |  |  |
| eLQ                       |              | 01 55 26 |                          |                           |             |      |  |  |

(continued)





| Palisades, New York |                       |          | 26     |                            |          | 1961 |  |  |
|---------------------|-----------------------|----------|--------|----------------------------|----------|------|--|--|
| Date                | Phase                 | h m s    | Date   | Phase                      | h m s    |      |  |  |
| Dec 27              | eP                    | 17 06 05 | Dec 29 | eLR                        | 22 09 40 |      |  |  |
|                     | e                     | 17 06 05 |        |                            |          |      |  |  |
|                     | e                     | 17 06 08 |        |                            |          |      |  |  |
|                     | eS                    | 17 06 16 | 29     | eLR                        | 22 35 40 |      |  |  |
|                     | eLg                   | 17 06 18 |        |                            |          |      |  |  |
| 27                  | e                     | 17 47 17 | 30     | eP                         | 00 50 23 |      |  |  |
|                     | eLg                   | 17 47 20 |        | P(Z) 4 sec 3.5 mic comp    |          |      |  |  |
| 27                  | eLR                   | 17 57 26 |        | iP                         | 00 50 26 |      |  |  |
|                     |                       |          |        | ePP                        | 00 52 43 |      |  |  |
| 27                  | eP                    | 19 08 00 |        | ePcS                       | 00 55 09 |      |  |  |
|                     | eS                    | 19 08 26 |        | iS                         | 00 59 27 |      |  |  |
|                     |                       |          |        | eScS                       | 01 00 45 |      |  |  |
| 27                  | eLR                   | 19 09 40 |        | e                          | 01 01 23 |      |  |  |
|                     |                       |          |        | eSS                        | 01 04 09 |      |  |  |
| 28                  | ePP                   | 00 09 24 |        | eLQ                        | 01 07 29 |      |  |  |
|                     | ePKS                  | 00 10 34 |        | eLR (NW)                   | 01 11 29 |      |  |  |
|                     | ePKS                  | 00 10 44 |        | Rat Islands, Aleutians     |          |      |  |  |
|                     | eSKS                  | 00 14 22 |        | USCGS 00 39 24.1           |          |      |  |  |
|                     | eSKKS                 | 00 16 24 |        | 52.3°N 177.7°E Dist. 68.3° |          |      |  |  |
|                     | ePS                   | 00 19 42 |        | Depth 52 km Mag. 7         |          |      |  |  |
|                     | ePPS                  | 00 21 18 |        | * Z 130, E 130, N 110      |          |      |  |  |
|                     | eSS                   | 00 26 34 | 30     | eLR (W)                    | 04 35 09 |      |  |  |
|                     | e                     | 00 27 38 |        | New Guinea                 |          |      |  |  |
|                     | e(SKSSKS)             | 00 29 18 | 30     | eLR                        | 07 15 09 |      |  |  |
|                     | eSSS                  | 00 31 38 |        |                            |          |      |  |  |
|                     | eLQ                   | 00 41 50 | 30     | eLR (NE)                   | 07 54 09 |      |  |  |
|                     | eLR (SW)              | 00 48 50 |        |                            |          |      |  |  |
|                     | eLR <sub>2</sub> (NE) | 01 40 10 | 30     | eP                         | 09 04 15 |      |  |  |
|                     |                       |          |        | eLQ                        | 09 25 09 |      |  |  |
|                     |                       |          |        | eLR (NW)                   | 09 29 39 |      |  |  |
|                     |                       |          |        | Aleutians                  |          |      |  |  |
|                     |                       |          |        | USCGS 08 53 14.4           |          |      |  |  |
|                     |                       |          |        | 51.9°N 177.6°E Dist. 68.4° |          |      |  |  |
|                     |                       |          |        | Depth 67 km                |          |      |  |  |
|                     |                       |          | 30     | eLR (SW)                   | 09 58 09 |      |  |  |
|                     |                       |          |        | Tonga Islands              |          |      |  |  |
| 28                  | eLR                   | 06 35 10 | 30     | eLR (N)                    | 10 47 39 |      |  |  |
| 28                  | eLR                   | 23 22 10 |        | Aleutians                  |          |      |  |  |
| 29                  | ePS                   | 00 26 02 | 30     | e                          | 11 50 09 |      |  |  |
|                     | eSS                   | 00 33 30 |        | e                          | 12 09 09 |      |  |  |
|                     | eSKKKS                | 00 37 22 |        | eLR                        | 12 34 09 |      |  |  |
|                     | eLQ                   | 00 46 20 |        |                            |          |      |  |  |
|                     | e                     | 00 49 40 | 30     | eLQ                        | 16 02 09 |      |  |  |
|                     | eLR (NW)              | 00 52 10 |        | eLR (NW)                   | 16 07 09 |      |  |  |
|                     | eLR <sub>2</sub>      | 01 50 10 |        | New Hebrides               |          |      |  |  |
|                     |                       |          | 30     | e                          | 16 52 55 |      |  |  |
|                     |                       |          |        |                            |          |      |  |  |
|                     |                       |          | 30     | eLQ                        | 17 09 49 |      |  |  |
|                     |                       |          |        | eLR (NW)                   | 17 15 09 |      |  |  |
|                     |                       |          |        | Aleutians                  |          |      |  |  |
| 29                  | eLR                   | 10 58 10 | 30     | e                          | 19 50 50 |      |  |  |
|                     | Solomon Islands       |          |        | e                          | 19 51 16 |      |  |  |
| 29                  | eLR                   | 13 29 10 | 30     | e                          | 20 53 46 |      |  |  |
|                     |                       |          |        | e                          | 20 54 06 |      |  |  |
| 29                  | eLQ                   | 15 07 40 | 30     | e                          | 21 21 47 |      |  |  |
|                     | eLR (SW)              | 15 10 10 |        |                            |          |      |  |  |
|                     | Off coast Guatemala   |          | 30     | eS                         | 23 32 49 |      |  |  |
| 29                  | eLR                   | 18 27 30 |        | eLQ                        | 23 34 09 |      |  |  |
| 29                  | eLR                   | 18 42 40 |        |                            |          |      |  |  |
| 29                  | eLR                   | 20 04 50 |        |                            |          |      |  |  |

| Palisades, New York |                   |          | 27   |       |       | 1961 |  |  |
|---------------------|-------------------|----------|------|-------|-------|------|--|--|
| Date                | Phase             | h m s    | Date | Phase | h m s |      |  |  |
| Dec 30              | Continued         |          |      |       |       |      |  |  |
|                     | eLR (SE)          | 23 36 01 |      |       |       |      |  |  |
|                     | N. Atlantic Ocean |          |      |       |       |      |  |  |
|                     | USCGS 23 20 16.9  |          |      |       |       |      |  |  |
|                     | 16.5°N 46.6°W     |          |      |       |       |      |  |  |
|                     | Depth 32 km       |          |      |       |       |      |  |  |
|                     | Dist. 33.3°       |          |      |       |       |      |  |  |
| 31                  | eLQ               | 02 52 39 |      |       |       |      |  |  |
|                     | eLR               | 02 55 39 |      |       |       |      |  |  |
| 31                  | eLR               | 05 10 39 |      |       |       |      |  |  |
| 31                  | eLQ               | 11 03 09 |      |       |       |      |  |  |
|                     | eLR               | 11 05 09 |      |       |       |      |  |  |
| 31                  | eLR               | 12 59 49 |      |       |       |      |  |  |
| 31                  | eLR               | 14 02 29 |      |       |       |      |  |  |
|                     | Halmahera         |          |      |       |       |      |  |  |
| 31                  | eLR (NW)          | 16 25 39 |      |       |       |      |  |  |
| 31                  | ePKP              | 16 27 18 |      |       |       |      |  |  |
|                     | Java              |          |      |       |       |      |  |  |
|                     | USCGS 16 07 46.4  |          |      |       |       |      |  |  |
|                     | 7.8°S 106.8°E     |          |      |       |       |      |  |  |
|                     | Depth 66 km       |          |      |       |       |      |  |  |
|                     | Dist. 147.1°      |          |      |       |       |      |  |  |
| 31                  | eP                | 16 40 36 |      |       |       |      |  |  |
|                     | eS                | 16 44 41 |      |       |       |      |  |  |
|                     | eLR               | 16 46 06 |      |       |       |      |  |  |
|                     | Central S. Dakota |          |      |       |       |      |  |  |
|                     | USCGS 16 35 58.7  |          |      |       |       |      |  |  |
|                     | 44.4°N 100.5°W    |          |      |       |       |      |  |  |
|                     | Depth 16 km       |          |      |       |       |      |  |  |
|                     | Dist. 20.1°       |          |      |       |       |      |  |  |
| 31                  | ePP               | 18 12 29 |      |       |       |      |  |  |
|                     | eS                | 18 17 13 |      |       |       |      |  |  |
|                     | eLR (SW)          | 18 20 39 |      |       |       |      |  |  |
|                     | Off coast Mexico  |          |      |       |       |      |  |  |
|                     | USCGS 18 04 25.4  |          |      |       |       |      |  |  |
|                     | 18.2°N 105.8°W    |          |      |       |       |      |  |  |
|                     | Depth 32 km       |          |      |       |       |      |  |  |
|                     | Dist. 35.8°       |          |      |       |       |      |  |  |
| 31                  | e                 | 18 11 27 |      |       |       |      |  |  |

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