

SECOND  
ANNUAL REPORT OF THE SEISMOGRAPH STATION  
AT WOODBRIDGE HILL, GUILDFORD,  
ENGLAND.

YEAR 1911.

SEISMOLOGICAL OBSERVATORY.

Geophysics Division,  
Dept. of Scientific & Industrial Research  
LIBRARY

**THE GEOGRAPHICAL POSITION** of this Seismograph is, longitude  $0^{\circ} 35' 47''$  west of Greenwich, latitude north  $51^{\circ} 15' 1''$ . Height of booms above mean sea-level (O.D.) is 187 ft.

**EXPERIMENTS.** From January 1st to September 7th, 1911, the boom facing North (here called N.) and the boom facing West (W.) both had a swing period of  $17\frac{1}{2}$  seconds, and were without multiplying levers. On September 8th magnetic damping was applied to W., and on October 17th the swing-period of W. was set to 10 seconds. Experiments on multiplying levers were then begun, in the course of which the constants of W. varied considerably.

**IN THIS REPORT** for 1911 are printed only those records which shew legible phases. Other corroborated movements of these booms will be found in the British Association circulars. From January to June, 1911, the preliminary phases have been carefully revised in the light of the registers from other stations; and where it is shewn that I have mistaken an air-tremor for a phase, or a phase for an air-tremor, I have tried to rectify the mistake. It appears as if the extra ("warning") phase given in this register represents the continuance of movement, caused by the second phase, after the arrival of the Long waves. The sign "L" has, therefore, been placed at the commencement of the "warning" phase.

The range of movement recorded during the earthquake of January 3-4, 1911, was computed from the amount of the fixed photographic slit which was uncovered; the relative position of the moveable slit, when at rest, being known for that evening.

Greenwich mean time is kept; but it is not proposed to record time *within* 0.1 minute.

**AIR-TREMORS** have been lessened by the magnetic damping; but where they have hindered the legibility of an earthquake they are noted as Ats. From October, 1910 to September, 1911, air-tremors were much heavier on the W. boom, which was open to full fluctuations of temperature, than on the N. boom, which was kept in air at a more equable temperature. This shows that slow currents of air in the instrument-case can cause air-tremors, but does not show that all tremors are thus caused.

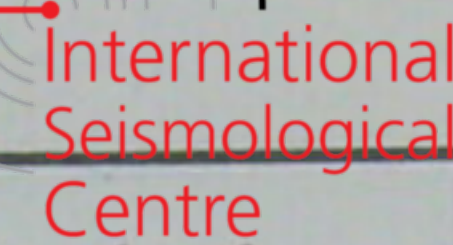
**TRAFFIC** does not affect these booms.

HILL VIEW,  
WOODBRIDGE HILL,  
GUILDFORD, *January 1st, 1912.*

F. EDWARD NORRIS.

| No. | Date<br>1911 | Preliminary Phase     |         |      | Second Phase          |                                                              |                                           | Warning Phase         |         |      | Principal Phase   |                                                               |                                                        | Aftershock                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                       |        | Total<br>Duration                  | Notes |     |  |
|-----|--------------|-----------------------|---------|------|-----------------------|--------------------------------------------------------------|-------------------------------------------|-----------------------|---------|------|-------------------|---------------------------------------------------------------|--------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|------------------------------------|-------|-----|--|
|     |              | Commence-<br>ment (P) | Maximum | a    | Commence-<br>ment (S) | Maximum                                                      | a                                         | Commence-<br>ment (L) | Maximum | a    | Commence-<br>ment | Maximum<br>(M)                                                | a                                                      | Maximum                                                                                                                                                                                                                                                                                                                                                         | a                                                                                                                                                                                                                                                                     |        |                                    |       |     |  |
|     |              | H M                   | H M     | MM   | H M                   | H M                                                          | MM                                        | H M                   | H M     | MM   | H M               | H M                                                           | MM                                                     | H M                                                                                                                                                                                                                                                                                                                                                             | H M                                                                                                                                                                                                                                                                   | MM     | H M                                | MM    | H M |  |
| 760 | Jan. 1       | 10 28                 | 10 30   | 0.03 | 10 33                 | 10 40.7                                                      | 0.25                                      | 10 44.3               | 10 45.9 | 0.35 | 10 46.5           | 10 49.7<br>10 50.7<br>10 52.5                                 | 1.7<br>4.7<br>4.8                                      | 11 42<br>11 55.5                                                                                                                                                                                                                                                                                                                                                | 0.07<br>0.1                                                                                                                                                                                                                                                           | 1 31   | N.                                 |       |     |  |
| 761 | Jan. 1       | 15 5.8                | 15 8.4  | 0.05 | 15 10.9               | 15 19.2                                                      | 0.1                                       | 15 24.4               | 15 25.3 | 0.07 | 15 27             | 15 30                                                         | 0.95                                                   | 15 34.5<br>15 53.5                                                                                                                                                                                                                                                                                                                                              | 0.3<br>0.15                                                                                                                                                                                                                                                           | 0 58.5 | W.                                 |       |     |  |
| 762 | Jan. 2       | 3 33.1                | 3 34    | 0.03 | 3 36.8                | 3 39.8                                                       | 0.02                                      | 3 44.7                | 3 45.5  | 0.02 | 3 46.4            | 3 51.3                                                        | 0.07                                                   |                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                       |        | N. Ats.                            |       |     |  |
| 763 | Jan. 2       | 10 45.3               | 10 49.1 | 0.07 | 10 57.4               | 11 0.8<br>11 23.3<br>11 32                                   | 0.1<br>0.05<br>0.07                       | 11 38.3               | 11 39.8 | 0.07 | 11 41.3           | 11 44.8<br>11 50.7                                            | 0.3<br>0.3                                             | 11 55.5                                                                                                                                                                                                                                                                                                                                                         | 0.15                                                                                                                                                                                                                                                                  | 1 45   | W.                                 |       |     |  |
| 767 | Jan. 2-3     | 23 50.2               | 23 51.3 | Mic  | 23 54.3               | 0 4.5<br>7 34.4                                              | 0.05<br>0.07                              | 0 20                  | 0 20.7  | Mic  | 0 22.4            | 0 30                                                          | 0.3                                                    | 0 41                                                                                                                                                                                                                                                                                                                                                            | 0.15                                                                                                                                                                                                                                                                  | 1 32   | N.                                 |       |     |  |
| 770 | Jan. 3       | 7 24                  | 7 25.5  | 0.05 | 7 30.9                | 7 44.8                                                       | 0.05                                      | 7 57.6                | 7 59.3  | 0.05 | 8 0.2             | 8 3.2<br>8 9.4                                                | 0.4<br>0.8                                             | 8 39.5<br>8 58.0                                                                                                                                                                                                                                                                                                                                                | 0.15<br>0.1                                                                                                                                                                                                                                                           | 1 39   | W.                                 |       |     |  |
| 775 | Jan. 3-4     | 23 34                 | 23 37   | 1.5  | 23 39.5               | 23 41.8<br>23 44.7<br>23 46.3<br>23 47.4<br>23 49.7<br>23 51 | 3.4<br>4.35<br>5.3<br>6.75<br>8.15<br>6.9 | 23 52.2               | 23 52.5 | 13.3 | 23 52.8           | 23 54<br>23 55<br>23 58.3<br>0 0.3<br>0 1.2<br>0 3.9<br>0 7.1 | 99.2<br>131.0<br>127.6<br>62.6<br>49.8<br>47.8<br>24.3 | 0 12.3<br>0 15.3<br>0 17.4<br>0 21.3<br>0 24.2<br>0 26.4<br>0 28.9<br>0 31.4<br>0 34.3<br>0 40<br>0 45.8<br>0 48.4<br>0 50.4<br>0 53.2<br>0 56<br>1 0.5<br>1 5.2<br>1 7.8<br>1 11.8<br>1 19.9<br>1 25.3<br>1 40<br>1 45<br>2 5.3<br>2 21.6<br>2 26.5<br>2 28.5<br>2 49.8<br>2 58.2<br>3 3.1<br>3 7.3<br>3 17.1<br>3 29.6<br>4 8.6<br>4 26.4<br>4 44.8<br>5 14.7 | 13.8<br>10.1<br>7.35<br>6.4<br>6.7<br>7.4<br>6.2<br>7.65<br>5.7<br>3.95<br>1.3<br>1.7<br>2.85<br>3.9<br>4.8<br>4.0<br>3.95<br>4.1<br>4.0<br>2.1<br>1.7<br>0.8<br>0.5<br>0.45<br>0.25<br>0.1<br>0.55<br>0.35<br>0.25<br>0.3<br>0.3<br>0.3<br>0.25<br>0.2<br>0.2<br>0.1 | 5 52   | W. Vyernyi (Russian<br>Turkestan). |       |     |  |





Seismological  
Centre

| No.  | Date<br>1911 | Preliminary Phase     |      |         |      |      | Second Phase          |      |         |      |      | Warning Phase         |      |         |      |      | Principal Phase   |      |                |      |      | Aftershock |      |      | Total<br>Duration | Notes |                                               |
|------|--------------|-----------------------|------|---------|------|------|-----------------------|------|---------|------|------|-----------------------|------|---------|------|------|-------------------|------|----------------|------|------|------------|------|------|-------------------|-------|-----------------------------------------------|
|      |              | Commence-<br>ment (P) |      | Maximum |      | a    | Commence-<br>ment (S) |      | Maximum |      | a    | Commence-<br>ment (L) |      | Maximum |      | a    | Commence-<br>ment |      | Maximum<br>(M) |      | a    | Maximum    |      | a    |                   |       |                                               |
|      |              | H                     | M    | H       | M    | MM   | H                     | M    | H       | M    | MM   | H                     | M    | H       | M    | MM   | H                 | M    | H              | M    | MM   | H          | M    | MM   |                   |       |                                               |
| 993  | April 5      | 15                    | 34.1 | 15      | 36   | 0.03 | 15                    | 39.6 | 15      | 42   | 0.02 |                       |      |         |      |      | 15                | 44.3 | 15             | 52.0 | 0.07 | 15         | 57   | 0.03 | 0                 | 32.5  | N.                                            |
| 1008 | April 7      | 6                     | 50.8 | 6       | 52.7 | 0.03 | 7                     | 0    | 7       | 8.4  | 0.1  | 7                     | 25.3 | 7       | 27   | 0.02 | 7                 | 28.5 | 7              | 35.2 | 0.1  | 7          | 57   | 0.1  | 2                 | 11    | N.                                            |
|      |              |                       |      |         |      |      |                       |      | 7       | 22.2 | 0.04 |                       |      |         |      |      |                   |      | 7              | 39.2 | 0.2  |            |      |      |                   |       |                                               |
| 1016 | April 10     | 1                     | 49.9 | 1       | 51.7 | Mic  | 1                     | 52.8 | 1       | 57.4 | 0.05 | 2                     | 0.3  |         |      | Mic  | 2                 | 1.1  | 2              | 1.8  | 0.07 | 2          | 13   | 0.05 | 0                 | 24    | N.                                            |
| 1025 | April 10     | 18                    | 31.1 | 18      | 34.2 | Mic  | 18                    | 39.4 | 18      | 40.8 | 0.05 | 19                    | 25.7 | 19      | 27.6 | 0.07 | 19                | 29.2 | 19             | 39.2 | 0.1  | 19         | 52.5 | 0.05 | 3                 | 0     | N.                                            |
|      |              |                       |      |         |      |      |                       |      | 19      | 5.3  | Mic  |                       |      |         |      |      |                   |      | 19             | 41.7 | 0.2  | 20         | 9    | 0.07 |                   |       |                                               |
|      |              |                       |      |         |      |      |                       |      | 19      | 22.6 | 0.1  |                       |      |         |      |      |                   |      |                |      |      | 20         | 21.5 | 0.05 |                   |       |                                               |
|      |              |                       |      |         |      |      |                       |      |         |      |      |                       |      |         |      |      |                   |      |                |      |      | 20         | 46.3 | Mic  |                   |       |                                               |
|      |              |                       |      |         |      |      |                       |      |         |      |      |                       |      |         |      |      |                   |      |                |      |      | 20         | 56.8 | Mic  |                   |       |                                               |
|      |              |                       |      |         |      |      |                       |      |         |      |      |                       |      |         |      |      |                   |      |                |      |      | 21         | 25   | Mic  |                   |       |                                               |
| 1032 | April 11     | 14                    | 26   | 14      | 29.2 | 0.05 | 14                    | 30.3 | 14      | 38.3 | 0.03 | 14                    | 39   | 14      | 40.4 | 0.05 | 14                | 40.7 | 14             | 48.6 | 0.25 | 15         | 26   | 0.1  | 1                 | 24    | W.                                            |
|      |              |                       |      |         |      |      |                       |      |         |      |      |                       |      |         |      |      |                   |      | 15             | 3.9  | 0.25 | 15         | 39.5 | 0.05 |                   |       |                                               |
|      |              |                       |      |         |      |      |                       |      |         |      |      |                       |      |         |      |      |                   |      | 15             | 9    | 0.1  |            |      |      |                   |       |                                               |
| 1043 | April 13     | 1                     | 31.3 | 1       | 33.1 | Mic  | 1                     | 39.3 | 1       | 42.5 | Mic  | 1                     | 58.9 |         |      |      | 2                 | 1    | 2              | 11.5 | Mic  |            |      |      | 0                 | 43    | N.                                            |
| 1055 | April 15     | 6                     | 16   | 6       | 17.1 | 0.05 | 6                     | 24.5 | 6       | 30.7 | 0.05 |                       |      |         |      |      | 6                 | 38.2 | 6              | 42.1 | 0.07 | 7          | 1    | 0.05 | 0                 | 47.5  | N.                                            |
| 1057 | April 15     | 12                    | 4.3  | 12      | 11.6 | Mic  | 12                    | 13.8 | 12      | 21.2 | Mic  | 12                    | 22.8 | 12      | 23.7 | 0.05 | 12                | 24.5 | 12             | 26.5 | 0.25 | 12         | 48.7 | 0.07 | 0                 | 49    | W.                                            |
|      |              |                       |      |         |      |      |                       |      |         |      |      |                       |      |         |      |      |                   |      | 12             | 30.8 | 0.25 |            |      |      |                   |       |                                               |
| 1066 | April 16     | 6                     | 1.8  | 6       | 4    | Mic  | 6                     | 5.4  | 6       | 12.9 | 0.05 | 6                     | 20.1 | 6       | 20.4 | Mic  | 6                 | 21.1 | 6              | 23.6 | 0.1  |            |      |      | 0                 | 22    | N.                                            |
| 1078 | April 17     | 5                     | 23.2 | 5       | 27.4 | 0.05 | 5                     | 31   | 5       | 35.3 | 0.2  | 5                     | 36.3 | 5       | 36.8 | 0.05 | 5                 | 37.2 | 5              | 40.8 | 0.4  | 5          | 48.3 | 0.1  | 0                 | 42    | W. Preceded by move-<br>ments, com.<br>4 59.2 |
|      |              |                       |      |         |      |      |                       |      |         |      |      |                       |      |         |      |      |                   |      | 5              | 55   | 0.07 |            |      |      |                   |       |                                               |
|      |              |                       |      |         |      |      |                       |      |         |      |      |                       |      |         |      |      |                   |      | 6              | 1.2  | 0.07 |            |      |      |                   |       |                                               |
| 1087 | April 18     | 17                    | 48.1 | 17      | 55.5 | 0.05 | 17                    | 58.4 | 18      | 28.3 | 0.05 | 18                    | 40.4 | 18      | 41.9 | 0.1  | 18                | 42.7 | 18             | 43.9 | 0.2  | 19         | 7    | 0.35 | 3                 | 53    | N.                                            |
|      |              |                       |      |         |      |      |                       |      | 18      | 35.7 | 0.2  |                       |      |         |      |      |                   |      | 18             | 46.4 | 0.2  | 19         | 13.5 | 0.4  |                   |       |                                               |
|      |              |                       |      |         |      |      |                       |      |         |      |      |                       |      |         |      |      |                   |      | 18             | 55.3 | 0.8  | 19         | 48.5 | 0.15 |                   |       |                                               |
|      |              |                       |      |         |      |      |                       |      |         |      |      |                       |      |         |      |      |                   |      | 18             | 58.6 | 0.75 | 20         | 11.2 | 0.05 |                   |       |                                               |
|      |              |                       |      |         |      |      |                       |      |         |      |      |                       |      |         |      |      |                   |      |                |      |      | 20         | 30.7 | 0.05 |                   |       |                                               |
|      |              |                       |      |         |      |      |                       |      |         |      |      |                       |      |         |      |      |                   |      |                |      |      | 21         | 4.3  | 0.1  |                   |       |                                               |
|      |              |                       |      |         |      |      |                       |      |         |      |      |                       |      |         |      |      |                   |      |                |      |      | 21         | 37   | 0.07 |                   |       |                                               |
| 1089 | April 20     | 0                     | 28.5 | 0       | 30.3 | 0.03 | 0                     | 33.7 | 0       | 37.5 | 0.05 | 0                     | 46.3 | 0       | 47.6 | Mic  | 0                 | 48.7 | 0              | 50.6 | 0.1  | 1          | 1    | 0.05 | 0                 | 43    | N.                                            |
| 1092 | April 21     | 2                     | 47.1 | 2       | 49.2 | 0.07 | 2                     | 57.3 | 3       | 21.5 | 0.1  | 3                     | 31.5 | 3       | 33.1 | 0.07 | 3                 | 34.4 | 3              | 39.6 | 0.3  | 3          | 56.8 | 0.2  | 1                 | 23.5  | W.                                            |
|      |              |                       |      | 2       | 50.2 | 0.07 |                       |      | 3       | 27.5 | 0.1  |                       |      |         |      |      |                   |      | 3              | 47.1 | 0.35 | 4          | 2.3  | 0.2  |                   |       |                                               |
| 1109 | April 23     | 13                    | 55.7 | 13      | 57.8 | 0.06 | 14                    | 3    | 14      | 4.7  | 0.05 | 14                    | 9.6  | 14      | 10.4 | Mic  | 14                | 11.7 | 14             | 16   | 0.15 | 14         | 34.5 | 0.1  | 0                 | 55    | N.                                            |
|      |              |                       |      | 14      | 1.8  | 0.05 |                       |      |         |      |      |                       |      |         |      |      |                   |      |                |      |      |            |      |      |                   |       |                                               |
| 1139 | April 28     | 19                    | 43.9 | 19      | 46.9 | 0.03 | 19                    | 50.8 | 19      | 53.1 | 0.02 |                       |      |         |      |      | 20                | 5.7  | 20             | 11   | 0.05 |            |      |      | 0                 | 36    | N.                                            |
|      |              |                       |      |         |      |      |                       |      | 19      | 58.7 | 0.02 |                       |      |         |      |      |                   |      |                |      |      |            |      |      |                   |       |                                               |

| No.  | Date<br>1911 | Preliminary Phase     |                                                     |                                    | Second Phase          |                                                 |                                  | Warning Phase         |                                        |                           | Principal Phase   |                                                                                                                                                  |                                                                                                         | Aftershock                                                                                                                                       |                                                                                                        | Total<br>Duration | Notes                             |
|------|--------------|-----------------------|-----------------------------------------------------|------------------------------------|-----------------------|-------------------------------------------------|----------------------------------|-----------------------|----------------------------------------|---------------------------|-------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|-------------------|-----------------------------------|
|      |              | Commence-<br>ment (P) | Maximum                                             | a                                  | Commence-<br>ment (S) | Maximum                                         | a                                | Commence-<br>ment (L) | Maximum                                | a                         | Commence-<br>ment | Maximum<br>(M)                                                                                                                                   | a                                                                                                       | Maximum                                                                                                                                          | a                                                                                                      |                   |                                   |
|      |              | H M                   | H M                                                 | MM                                 | H M                   | H M                                             | MM                               | H M                   | H M                                    | MM                        | H M               | H M                                                                                                                                              | MM                                                                                                      | H M                                                                                                                                              | MM                                                                                                     | H M               |                                   |
| 1142 | April 29     | 5 42.9                | 5 45.1                                              | 0.02                               | 5 48.3                | 5 49.2                                          | 0.07                             |                       |                                        |                           | 5 55.3            | 5 58.5<br>6 4                                                                                                                                    | 0.07<br>0.07                                                                                            |                                                                                                                                                  |                                                                                                        |                   | N.                                |
| 1153 | April 30     | 5 4.2                 | 5 5.7                                               | Mic                                | 5 8                   | 5 16.2                                          | 0.05                             | On the fastening band |                                        |                           |                   | 5 21.3                                                                                                                                           | 0.07                                                                                                    |                                                                                                                                                  |                                                                                                        | 0 38              | N.                                |
| 1156 | April 30     | 20 45.7               | 20 47.7                                             | 0.02                               | 20 49.9               | 20 50.5                                         | 0.02                             |                       |                                        |                           | 20 52.7           | 20 57.2                                                                                                                                          | 0.15                                                                                                    | 21 13                                                                                                                                            | 0.02                                                                                                   | 0 30              | W.                                |
| 1165 | May 4        | 14 23.5               | 14 25.8                                             | 0.02                               | 14 28.3               | 14 33.5<br>14 38.7                              | 0.07<br>0.07                     |                       |                                        |                           | 14 41             | 14 42.2<br>14 53.2                                                                                                                               | 0.1<br>0.2                                                                                              |                                                                                                                                                  |                                                                                                        | 0 48.5            | W.                                |
| 1167 | May 4-5      | 23 47.9               | 23 48.2                                             | 0.03                               | 23 51.2               | 23 55.7                                         | 0.05                             |                       |                                        |                           | 23 58             | 0 4.2<br>0 5.7<br>0 6.7<br>0 8<br>0 9.3<br>0 12.6<br>0 22.7<br>0 26.6                                                                            | 1.4<br>1.6<br>1.7<br>1.8<br>1.45<br>0.95<br>0.55<br>1.45                                                | 0 40.4<br>0 50.2<br>1 4.4<br>1 16.8<br>1 24.6<br>1 43.5<br>1 48.8<br>2 15                                                                        | 0.7<br>0.6<br>0.4<br>0.25<br>0.25<br>0.05<br>0.07<br>0.05                                              | 3 32              | N.                                |
| 1177 | May 9        | 19 59.7               | 20 0.9                                              | 0.03                               | 20 3.2                | 20 5.4                                          | 0.02                             |                       |                                        |                           | 20 8.4            | 20 9<br>20 12.1                                                                                                                                  | 0.03<br>0.05                                                                                            |                                                                                                                                                  |                                                                                                        | 0 22              | N.                                |
| 1184 | May 11       | 4 54                  | 4 56.1                                              | 0.07                               | 5 0                   | 5 6.7                                           | 0.2                              | 5 10.6                | 5 11                                   | Mic                       | 5 11.3            | 5 15.1<br>5 22                                                                                                                                   | 0.25<br>0.4                                                                                             | 6 3<br>6 19<br>6 38.7<br>6 58.5                                                                                                                  | 0.07<br>0.15<br>0.1<br>0.05                                                                            | 2 10              | W. Preceded by small<br>movements |
| 1190 | May 13       | 3 34.2                | 3 38.4                                              | 0.04                               | 3 43.5                | 3 51.3<br>3 57.6                                | 0.03<br>0.03                     |                       |                                        |                           | 4 16              | 4 35.4<br>4 46.2                                                                                                                                 | 0.03<br>0.04                                                                                            | 4 49.7                                                                                                                                           | 0.02                                                                                                   | 1 24              | N.                                |
| 1257 | June 7       | 11 15                 | 11 15.6<br>11 17.8<br>11 19.7<br>11 22.2<br>11 24.9 | 0.2<br>0.25<br>0.25<br>0.2<br>0.25 | 11 25.7               | 11 26.3<br>11 35.3<br>11 38.4<br>11 42<br>11 44 | 0.8<br>0.8<br>1.0<br>1.65<br>2.0 | 11 45.4               | 11 46<br>11 46.5<br>11 47.1<br>11 47.7 | 1.7<br>1.3<br>1.65<br>1.9 | 11 48.3           | 11 50<br>11 51.1<br>11 53.6<br>11 56<br>11 57.9<br>12 1.3<br>12 7.5<br>12 10.4<br>12 12.4<br>12 18.8<br>12 24.3<br>12 26.5<br>12 29.2<br>12 33.8 | 2.05<br>3.0<br>11.55<br>8.95<br>13.3<br>12.0<br>9.0<br>10.4<br>11.2<br>7.4<br>7.15<br>6.5<br>5.1<br>3.4 | 12 46<br>12 55.5<br>13 16.9<br>13 23.2<br>13 32.7<br>13 38<br>13 51.8<br>14 14.6<br>14 33.3<br>14 51.8<br>15 20.8<br>15 43<br>15 58.7<br>16 21.7 | 1.95<br>2.95<br>1.0<br>0.8<br>0.85<br>0.6<br>0.4<br>0.25<br>0.15<br>0.1<br>0.15<br>0.1<br>0.07<br>0.05 | 5 15              | N.                                |
| 1260 | June 8       | 0 5.3                 | 0 6.1                                               | 0.03                               | 0 10.8                | 0 12.8<br>0 18.0                                | 0.04<br>0.03                     |                       |                                        |                           | 0 19.3            | 0 25.2                                                                                                                                           | 0.35                                                                                                    | 0 37                                                                                                                                             | 0.2                                                                                                    | 1 27              | N.                                |

Intermaximal lulls MM  
 11 51.6 0.9  
 11 55 6.7  
 12 0.2 9.1  
 12 5 6.3  
 12 8.9 7.8  
 12 42.8 1.5

| No.  | Date<br>1911 | Preliminary Phase     |      |         |      |      | Second Phase          |      |         |      |      | Warning Phase         |      |         |      |      | Principal Phase   |      |                |      |      | Aftershock |      |      |                   |      | Total<br>Duration     | Notes |
|------|--------------|-----------------------|------|---------|------|------|-----------------------|------|---------|------|------|-----------------------|------|---------|------|------|-------------------|------|----------------|------|------|------------|------|------|-------------------|------|-----------------------|-------|
|      |              | Commence-<br>ment (P) |      | Maximum |      | a    | Commence-<br>ment (S) |      | Maximum |      | a    | Commence-<br>ment (L) |      | Maximum |      | a    | Commence-<br>ment |      | Maximum<br>(M) |      | a    | Maximum    |      | a    | Total<br>Duration |      |                       |       |
|      |              | H                     | M    | H       | M    | MM   | H                     | M    | H       | M    | MM   | H                     | M    | H       | M    | MM   | H                 | M    | H              | M    | MM   | H          | M    | MM   | H                 | M    |                       |       |
| 1284 | June 15      | 14                    | 33   | 14      | 34.5 | 0.05 | 14                    | 41.7 | 14      | 46.7 | 1.2  | 15                    | 11.5 | 15      | 12.3 | 0.8  | 15                | 13   | 15             | 17.4 | 5.0  | 15         | 45.2 | 3.0  | 4                 | 31   | N.                    |       |
|      |              |                       |      | 14      | 38.5 | 0.25 |                       |      | 14      | 49.3 | 1.0  |                       |      |         |      |      |                   |      | 15             | 18.8 | 6.9  | 15         | 47.1 | 3.1  |                   |      |                       |       |
|      |              |                       |      | 14      | 40.8 | 0.15 |                       |      | 14      | 55   | 2.0  |                       |      |         |      |      |                   |      | 15             | 20.7 | 6.3  | 15         | 52.6 | 3.3  |                   |      |                       |       |
|      |              |                       |      |         |      |      |                       |      | 14      | 58.5 | 1.7  |                       |      |         |      |      |                   |      | 15             | 21.5 | 6.8  | 15         | 55.5 | 3.5  |                   |      |                       |       |
|      |              |                       |      |         |      |      |                       |      | 15      | 3    | 1.3  |                       |      |         |      |      |                   |      | 15             | 26.2 | 4.4  | 16         | 1.4  | 2.0  |                   |      |                       |       |
|      |              |                       |      |         |      |      |                       |      | 15      | 10.4 | 2.0  |                       |      |         |      |      |                   |      | 15             | 30.2 | 1.4  | 16         | 15   | 0.5  |                   |      |                       |       |
|      |              |                       |      |         |      |      |                       |      |         |      |      |                       |      |         |      |      |                   |      | 15             | 33   | 2.9  | 16         | 18.5 | 0.6  |                   |      |                       |       |
|      |              |                       |      |         |      |      |                       |      |         |      |      |                       |      |         |      |      |                   |      | 15             | 37.6 | 4.9  | 16         | 23.3 | 0.2  |                   |      |                       |       |
|      |              |                       |      |         |      |      |                       |      |         |      |      |                       |      |         |      |      |                   |      |                |      |      | 16         | 33   | 0.3  |                   |      |                       |       |
|      |              |                       |      |         |      |      |                       |      |         |      |      |                       |      |         |      |      |                   |      |                |      |      | 16         | 44.4 | 0.15 |                   |      |                       |       |
|      |              |                       |      |         |      |      |                       |      |         |      |      |                       |      |         |      |      |                   |      |                |      |      | 16         | 51   | 0.2  |                   |      |                       |       |
|      |              |                       |      |         |      |      |                       |      |         |      |      |                       |      |         |      |      |                   |      |                |      |      | 16         | 55.6 | 0.6  |                   |      |                       |       |
|      |              |                       |      |         |      |      |                       |      |         |      |      |                       |      |         |      |      |                   |      |                |      |      | 17         | 12.3 | 0.1  |                   |      |                       |       |
|      |              |                       |      |         |      |      |                       |      |         |      |      |                       |      |         |      |      |                   |      |                |      |      | 17         | 25   | 0.2  |                   |      |                       |       |
|      |              |                       |      |         |      |      |                       |      |         |      |      |                       |      |         |      |      |                   |      |                |      |      | 17         | 47.8 | 0.05 |                   |      |                       |       |
|      |              |                       |      |         |      |      |                       |      |         |      |      |                       |      |         |      |      |                   |      |                |      |      | 17         | 51.5 | 0.07 |                   |      |                       |       |
|      |              |                       |      |         |      |      |                       |      |         |      |      |                       |      |         |      |      |                   |      |                |      |      | 18         | 34   | 0.05 |                   |      |                       |       |
| 1287 | June 17      | 5                     | 39.8 | 5       | 42.5 | Mic  | 5                     | 43.6 | 5       | 56.7 | 0.05 | 5                     | 58.5 | 5       | 59.3 | 0.04 | 6                 | 1    | 6              | 11.1 | 0.8  | 6          | 43.8 | 0.08 | 1                 | 26   | N.                    |       |
| 1329 | June 28      | 21                    | 2.5  | 21      | 5.3  | 0.02 | 21                    | 7.3  | 21      | 30.5 | 0.02 | 21                    | 33.5 | 21      | 34   | Mic  | 21                | 34.5 | 21             | 37   | 0.06 | 22         | 1.3  | 0.03 | 1                 | 37   | N.                    |       |
| 1340 | July 1       | 22                    | 33.4 | 22      | 35.3 | 0.02 | 22                    | 37.1 | 22      | 38.6 | 0.05 | 22                    | 41.3 |         |      | Nil  | 22                | 41.8 | 22             | 44   | 0.95 | 22         | 51.3 | 0.45 | 1                 | 7    | N.                    |       |
|      |              |                       |      |         |      | 0.1  |                       |      | 22      | 40.7 | 0.1  |                       |      |         |      |      |                   |      |                |      |      |            |      |      |                   |      |                       |       |
| 1349 | July 3       | 20                    | 0    | 20      | 0.9  | 0.02 | 20                    | 2.8  | 20      | 11.4 | Mic  |                       |      |         |      |      | 20                | 14.6 | 20             | 19.6 | 0.07 | 20         | 33.7 | 0.03 | 0                 | 37.5 | N.                    |       |
| 1350 | July 3       | 22                    | 11   | 22      | 11.7 | 0.02 | 22                    | 15.6 | 22      | 19.2 | 0.02 |                       |      |         |      |      | 22                | 25.5 | 22             | 26   | 0.05 |            |      |      | 0                 | 33   | N.                    |       |
|      |              |                       |      |         |      | Mic  |                       |      | 22      | 24.5 | Mic  |                       |      |         |      |      |                   |      |                |      |      |            |      |      |                   |      |                       |       |
| 1351 | July 3       | 22                    | 52.6 | 22      | 53.2 | Mic  | 22                    | 55.5 | 22      | 59.3 | Mic  | 23                    | 0.2  | 23      | 0.4  | Mic  | 23                | 1.1  | 23             | 4.2  | 0.1  |            |      |      | 0                 | 20   | N.                    |       |
| 1354 | July 4       | 13                    | 44   | 13      | 45.8 | 0.07 | 13                    | 52.2 | 13      | 55.1 | 0.9  | 14                    | 2    | 14      | 3.2  | 0.9  | 14                | 6    | 14             | 7.5  | 1.8  | 15         | 14.5 | 0.05 | 1                 | 57   | N.                    |       |
|      |              |                       |      | 13      | 46.6 | 0.07 |                       |      | 13      | 56.7 | 1.0  |                       |      |         |      |      |                   |      | 14             | 12.5 | 4.0  | 15         | 27.5 | 0.1  |                   |      |                       |       |
|      |              |                       |      | 13      | 48.3 | 0.25 |                       |      | 13      | 58   | 1.1  |                       |      |         |      |      |                   |      | 14             | 18.6 | 3.0  | 15         | 36.7 | 0.03 |                   |      |                       |       |
|      |              |                       |      |         |      |      |                       |      | 13      | 59.7 | 0.7  |                       |      |         |      |      |                   |      |                |      |      |            |      |      |                   |      |                       |       |
|      |              | 13                    | 44   | 13      | 48.3 | 0.05 | 13                    | 52.1 | 13      | 55   | 0.85 | 14                    | 2    | 14      | 3.2  | 0.65 | 14                | 7.2  | 14             | 7.9  | 1.7  | 16         | 41   | 0.05 | 3                 | 11   | W. Intermaximal lulls |       |
|      |              |                       |      |         |      |      |                       |      | 13      | 56.3 | 0.95 |                       |      | 14      | 5.7  | 1.25 |                   |      | 14             | 11.8 | 1.15 |            |      |      |                   |      |                       |       |
|      |              |                       |      |         |      |      |                       |      | 14      | 0.5  | 2.0  |                       |      |         |      |      |                   |      | 14             | 14.5 | 0.95 |            |      |      |                   |      |                       |       |
|      |              |                       |      |         |      |      |                       |      |         |      |      |                       |      |         |      |      |                   |      | 14             | 21   | 1.0  |            |      |      |                   |      |                       |       |
| 1355 | July 5       | 2                     | 31   | 2       | 34.2 | 0.03 | 2                     | 37.9 | 2       | 44.2 | 0.15 | 2                     | 44.6 | 2       | 45   | 0.04 | 2                 | 45.2 | 2              | 47.9 | 1.1  | 3          | 28.5 | 0.05 | 1                 | 43.5 | W.                    |       |
|      |              |                       |      |         |      |      |                       |      |         |      |      |                       |      |         |      |      |                   |      |                |      |      | 3          | 50   | 0.03 |                   |      |                       |       |
|      |              |                       |      |         |      |      |                       |      |         |      |      |                       |      |         |      |      |                   |      |                |      |      | 3          | 56.4 | 0.04 |                   |      |                       |       |
|      |              |                       |      |         |      |      |                       |      |         |      |      |                       |      |         |      |      |                   |      |                |      |      | 4          | 10   | 0.03 |                   |      |                       |       |
| 1357 | July 5       | 18                    | 55.3 | 18      | 56.3 | 0.02 | 18                    | 58.2 | 19      | 2.8  | 0.05 |                       |      |         |      |      | 19                | 6.1  | 19             | 10.9 | 0.1  | 19         | 21.4 | 0.06 | 0                 | 32.8 | W.                    |       |
|      |              |                       |      |         |      | 0.04 |                       |      | 19      | 5.4  | 0.04 |                       |      |         |      |      |                   |      |                |      |      |            |      |      |                   |      |                       |       |
| 1366 | July 8       | 1                     | 5.5  | 1       | 8    | Mic  | 1                     | 9.5  | 1       | 11   | 0.1  | 1                     | 20.7 | 1       | 21.5 | 0.07 | 1                 | 22   | 1              | 23.4 | 0.15 | 1          | 53.4 | 0.03 | 1                 | 8    | W.                    |       |
|      |              |                       |      |         |      |      |                       |      |         |      |      |                       |      |         |      |      |                   |      |                |      |      | 2          | 8    | 0.02 |                   |      |                       |       |

| No.  | Date<br>1911 | Preliminary Phase     |      |         |      |      | Second Phase          |      |         |      |      | Warning Phase         |      |         |      |      | Principal Phase   |      |                |      |      | Aftershock |      |      |   |      | Total<br>Duration | Notes |                              |
|------|--------------|-----------------------|------|---------|------|------|-----------------------|------|---------|------|------|-----------------------|------|---------|------|------|-------------------|------|----------------|------|------|------------|------|------|---|------|-------------------|-------|------------------------------|
|      |              | Commence-<br>ment (P) |      | Maximum |      | a    | Commence-<br>ment (S) |      | Maximum |      | a    | Commence-<br>ment (L) |      | Maximum |      | a    | Commence-<br>ment |      | Maximum<br>(M) |      | a    | Maximum    |      | a    |   |      |                   |       |                              |
|      |              | H                     | M    | H       | M    | MM   | H                     | M    | H       | M    | MM   | H                     | M    | H       | M    | MM   | H                 | M    | H              | M    | MM   | H          | M    | MM   | H | M    |                   |       |                              |
| 1380 | July 11      | 22                    | 32.1 | 22      | 33   | Mic  | 22                    | 35.3 | 22      | 41.4 | 0.02 | 22                    | 47   | 22      | 48.1 | Mic  | 22                | 48.9 | 22             | 50.8 | 0.05 | 22         | 57.7 | 0.03 | 0 | 50   |                   | W.    |                              |
| 1381 | July 12      | 4                     | 22.7 | 4       | 26.6 | 0.05 | 4                     | 32.7 | 4       | 34   | 0.25 | 5                     | 4.3  | 5       | 7    | 0.95 | 5                 | 8.9  | 5              | 12   | 2.0  | 5          | 33.2 | 0.95 | 4 | 8    |                   | N.    |                              |
|      |              |                       |      | 4       | 29.1 | 0.03 |                       |      | 4       | 37.5 | 0.3  |                       |      | 5       | 8.3  | 0.95 |                   |      | 5              | 13.9 | 2.0  | 5          | 37.9 | 0.4  |   |      |                   |       |                              |
|      |              |                       |      |         |      |      |                       |      | 4       | 45.2 | 0.8  |                       |      |         |      |      |                   |      | 5              | 17.8 | 2.75 | 5          | 45.8 | 0.55 |   |      |                   |       |                              |
|      |              |                       |      |         |      |      |                       |      | 4       | 48.3 | 0.9  |                       |      |         |      |      |                   |      | 5              | 24.8 | 1.9  | 5          | 54.2 | 0.25 |   |      |                   |       |                              |
|      |              |                       |      |         |      |      |                       |      | 4       | 50.7 | 0.9  |                       |      |         |      |      |                   |      |                |      |      | 6          | 3.1  | 0.2  |   |      |                   |       |                              |
|      |              |                       |      |         |      |      |                       |      | 4       | 56.6 | 0.95 |                       |      |         |      |      |                   |      |                |      |      | 6          | 12.1 | 0.2  |   |      |                   |       |                              |
|      |              |                       |      |         |      |      |                       |      | 5       | 1.4  | 1.0  |                       |      |         |      |      |                   |      |                |      |      | 6          | 29.2 | 0.2  |   |      |                   |       |                              |
|      |              |                       |      |         |      |      |                       |      |         |      |      |                       |      |         |      |      |                   |      |                |      |      | 6          | 32.7 | 0.25 |   |      |                   |       |                              |
|      |              |                       |      |         |      |      |                       |      |         |      |      |                       |      |         |      |      |                   |      |                |      |      | 6          | 43.8 | 0.4  |   |      |                   |       |                              |
|      |              |                       |      |         |      |      |                       |      |         |      |      |                       |      |         |      |      |                   |      |                |      |      | 6          | 51   | 0.25 |   |      |                   |       |                              |
|      |              |                       |      |         |      |      |                       |      |         |      |      |                       |      |         |      |      |                   |      |                |      |      | 7          | 12.2 | 0.03 |   |      |                   |       |                              |
|      |              |                       |      |         |      |      |                       |      |         |      |      |                       |      |         |      |      |                   |      |                |      |      | 7          | 38   | 0.03 |   |      |                   |       |                              |
|      |              |                       |      |         |      |      |                       |      |         |      |      |                       |      |         |      |      |                   |      |                |      |      | 8          | 14.5 | 0.06 |   |      |                   |       |                              |
| 1383 | July 12      | 13                    | 22.6 | 13      | 24.3 | Mic  |                       |      |         |      |      |                       |      |         |      |      | 13                | 27.3 | 13             | 29.3 | Mic  |            |      |      | 0 | 20   |                   | W.    |                              |
| 1388 | July 13      | 9                     | 24   | 9       | 25.8 | 0.1  | 9                     | 30.7 | 9       | 33.5 | 0.02 |                       |      |         |      |      | 9                 | 35.5 | 9              | 37.8 | 0.2  | 9          | 44.2 | 0.1  | 0 | 37.5 |                   | N.    |                              |
| 1391 | July 14      | 2                     | 38   | 2       | 42.4 | 0.07 | 2                     | 43.2 | 2       | 44.8 | 0.1  | 2                     | 49.3 |         |      | Nil  | 2                 | 50.3 | 2              | 57   | 0.25 | 3          | 9.8  | 0.1  | 0 | 50.5 |                   | W.    |                              |
| 1402 | July 19      | 10                    | 27.8 | 10      | 30.8 | 0.03 | 10                    | 33.5 | 10      | 41.1 | 0.03 | 10                    | 44.1 |         |      |      | 10                | 45   | 10             | 47.2 | 0.15 |            |      |      | 0 | 35   |                   | N.    |                              |
| 1405 | July 19      | 20                    | 43.6 | 20      | 46.8 | 0.03 | 20                    | 50   | 21      | 7    | 0.03 |                       |      |         |      |      | 21                | 20   | 21             | 30.5 | 0.2  | 22         | 29   | 0.05 | 1 | 58.5 |                   | N.    |                              |
|      |              |                       |      |         |      |      |                       |      |         |      |      |                       |      |         |      |      |                   |      | 21             | 38.2 | 0.35 | 22         | 39.8 | 0.05 |   |      |                   |       | Intermaximal<br>lull 21 35.8 |
| 1414 | July 22      | 6                     | 13   | 6       | 14.2 | 0.03 | 6                     | 18.5 | 6       | 21   | 0.04 | 6                     | 22.6 | 6       | 23.5 | 0.02 | 6                 | 24.5 | 6              | 29.7 | 0.07 | 6          | 39.7 | 0.06 | 0 | 39   |                   | N.    |                              |
| 1419 | July 23      | 17                    | 6    | 17      | 8    | 0.02 | 17                    | 10.4 | 17      | 17.7 | 0.02 | 17                    | 18.8 | 17      | 19.6 | 0.02 | 17                | 20.5 | 17             | 25.5 | 0.2  | 18         | 30   | 0.07 | 1 | 38   |                   | N.    |                              |
|      |              |                       |      |         |      |      |                       |      |         |      |      |                       |      |         |      |      |                   |      | 17             | 35   | 0.95 |            |      |      |   |      |                   |       |                              |
| 1426 | July 27      | 12                    | 15   | 12      | 19   | 0.02 | 12                    | 20.7 | 12      | 24.1 | 0.02 |                       |      |         |      |      | 12                | 34   | 12             | 38   | 0.2  | 13         | 8    | 0.07 | 1 | 22   |                   | N.    |                              |
|      |              |                       |      |         |      |      |                       |      |         |      |      |                       |      |         |      |      |                   |      |                |      |      | 13         | 22   | 0.05 |   |      |                   |       |                              |
| 1430 | July 29      | 10                    | 16.6 | 10      | 19.3 | Mic  | 10                    | 22.8 | 10      | 27.7 | Mic  | 10                    | 33.1 | 10      | 33.6 | Mic  | 10                | 35.5 | 10             | 40.7 | 0.4  | 11         | 32.7 | 0.04 | 1 | 54   |                   | W.    |                              |
|      |              |                       |      |         |      |      |                       |      |         |      |      |                       |      |         |      |      |                   |      | 10             | 44.6 | 0.4  |            |      |      |   |      |                   |       |                              |
| 1437 | Aug. 4       | 2                     | 2.1  | 2       | 5    | 0.1  | 2                     | 10   | 2       | 13.3 | 0.03 | 2                     | 19   | 2       | 20.5 | 0.03 | 2                 | 21.3 | 2              | 30   | 0.07 | 2          | 40   | 0.03 | 0 | 44   |                   | N.    |                              |
| 1459 | Aug. 16      | 22                    | 56.9 | 22      | 58.5 | 0.2  | 23                    | 6.1  | 23      | 7.7  | 0.2  | 23                    | 35.9 | 23      | 36.8 | 0.7  | 23                | 39.6 | 23             | 40.7 | 1.0  | 0          | 20.6 | 1.9  | 4 | 0    |                   | N.    |                              |
|      |              |                       |      |         |      |      |                       |      | 23      | 11.6 | 0.4  |                       |      | 23      | 37.5 | 0.85 |                   |      | 23             | 46.6 | 3.5  | 0          | 33.2 | 1.1  |   |      |                   |       |                              |
|      |              |                       |      |         |      |      |                       |      | 23      | 16.6 | 0.95 |                       |      | 23      | 38.1 | 1.0  |                   |      | 23             | 48.5 | 7.5  | 0          | 45   | 0.95 |   |      |                   |       |                              |
|      |              |                       |      |         |      |      |                       |      | 23      | 19   | 1.0  |                       |      | 23      | 38.7 | 0.8  |                   |      | 23             | 53.8 | 7.6  | 0          | 52   | 0.95 |   |      |                   |       |                              |
|      |              |                       |      |         |      |      |                       |      | 23      | 26   | 0.4  |                       |      |         |      |      |                   |      | 23             | 56.2 | 13.9 | 0          | 56   | 0.9  |   |      |                   |       |                              |
|      |              |                       |      |         |      |      |                       |      | 23      | 27.5 | 0.5  |                       |      |         |      |      |                   |      | 0              | 11   | 3.1  | 0          | 58.4 | 0.8  |   |      |                   |       |                              |
|      |              |                       |      |         |      |      |                       |      | 23      | 31.2 | 1.0  |                       |      |         |      |      |                   |      |                |      |      | 1          | 3.8  | 0.7  |   |      |                   |       |                              |
|      |              |                       |      |         |      |      |                       |      | 23      | 34.7 | 0.9  |                       |      |         |      |      |                   |      |                |      |      | 1          | 10.7 | 0.35 |   |      |                   |       |                              |
|      |              |                       |      |         |      |      |                       |      |         |      |      |                       |      |         |      |      |                   |      |                |      |      | 1          | 15.2 | 0.65 |   |      |                   |       |                              |
|      |              |                       |      |         |      |      |                       |      |         |      |      |                       |      |         |      |      |                   |      |                |      |      | 1          | 39   | 0.4  |   |      |                   |       |                              |
|      |              |                       |      |         |      |      |                       |      |         |      |      |                       |      |         |      |      |                   |      |                |      |      | 2          | 29.5 | 0.2  |   |      |                   |       |                              |
|      |              |                       |      |         |      |      |                       |      |         |      |      |                       |      |         |      |      |                   |      |                |      |      | 2          | 50.5 | 0.1  |   |      |                   |       |                              |

| No.   | Date<br>1911 | Preliminary Phase     |                  |              | Second Phase          |                          |                      | Warning Phase         |                  |              | Principal Phase   |                                                                    |                                                   | Aftershock                                                              |                                                             |       | Total<br>Duration                             | Notes |
|-------|--------------|-----------------------|------------------|--------------|-----------------------|--------------------------|----------------------|-----------------------|------------------|--------------|-------------------|--------------------------------------------------------------------|---------------------------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------|-------|-----------------------------------------------|-------|
|       |              | Commence-<br>ment (P) | Maximum          | a            | Commence-<br>ment (S) | Maximum                  | a                    | Commence-<br>ment (L) | Maximum          | a            | Commence-<br>ment | Maximum<br>(M)                                                     | a                                                 | Maximum                                                                 | a                                                           |       |                                               |       |
|       |              |                       |                  |              |                       |                          |                      |                       |                  |              |                   |                                                                    |                                                   |                                                                         |                                                             |       |                                               |       |
| 1465  | Aug. 21      | 16 54.2               | 16 57.3          | Mic          | 17 0.7                | 17 7.6<br>17 11.4        | 0.07<br>0.06         | 17 13.4               | 17 14.5          | Mic          | 17 15.2           | 17 19.5<br>17 37.7                                                 | 0.25<br>0.55                                      | 17 53.4                                                                 | 0.25                                                        | 1 52  | N. Probably two earth-<br>quakes              |       |
| 1466  | Aug. 22      | 7 6.9                 | 7 8.5            | 0.02         | 7 13                  | 7 16.7                   | 0.04                 |                       |                  |              | 7 21.9            | 7 30.7                                                             | 0.08                                              |                                                                         |                                                             | 0 30  | N.                                            |       |
| 1467  | Aug. 23      | 16 21.3               | 16 25            | ?            | 16 27.7               | 16 35.3                  | ?                    | 16 37.5               | 16 38            | ?            | 16 38.5           | 16 40.8                                                            | 0.4                                               |                                                                         |                                                             | 0 53  | N.                                            |       |
| 1495  | Sept. 6      | 1 11                  | 1 14             | Mic          | 1 17                  | 1 18                     | 0.05                 |                       |                  |              | 1 23.5            | 1 28.3                                                             | 0.15                                              |                                                                         |                                                             | 2 1 0 | W.                                            |       |
| 1496  | Sept. 8      | 23 4.7                | 23 8             | 0.03         | 23 10.7               | 23 12.4                  | 0.02                 | 23 24.5               | 23 25.4          | Mic          | 23 26.8           | 23 29.1<br>23 33.5<br>23 37.3<br>23 39.8                           | 0.2<br>0.35<br>0.25<br>0.2                        | 23 46.7<br>23 50.4                                                      | 0.1<br>0.1                                                  | 0 54  | W. (Swing of W.<br>boom damped by<br>magnets) |       |
| 1510  | Sept. 13     | 3 24.7                | 3 26.8           | 0.02         | 3 30.7                | 3 31.8<br>3 35.3         | 0.02<br>0.03         | 3 40.6                | 3 41             | Mic          | 3 42.3            | 3 43.5                                                             | 0.1                                               | 3 50.3                                                                  | 0.04                                                        | 0 41  | W.                                            |       |
| 1512  | Sept. 15     | 13 23                 | 13 24<br>13 26.7 | 0.02<br>0.02 | 13 30.5               | 13 38.2                  | 0.1                  | 13 48                 | 13 51            | 0.05         | 13 52.5           | 13 55.2<br>14 2<br>14 9.7                                          | 0.2<br>0.45<br>0.15                               | 14 25.5<br>15 5.5<br>15 35.2                                            | 0.1<br>0.06<br>0.04                                         | 3 37  | W.                                            |       |
| 1519  | Sept. 17     | 3 48.6                | 3 49.7<br>3 54.9 | 0.03<br>0.03 | 3 56.9                | 4 3                      | 0.1                  | 4 5.1                 | 4 8              | 0.15         | 4 9.4             | 4 11.2<br>4 15.3<br>4 19.4<br>4 23.4<br>4 26.5<br>4 29.5<br>4 31.1 | 0.45<br>0.6<br>0.65<br>0.25<br>0.35<br>0.4<br>0.3 | 4 39.3<br>4 43<br>4 47.2<br>4 52.1<br>4 56.8<br>5 2.6<br>5 27.8<br>6 20 | 0.07<br>0.15<br>0.15<br>0.15<br>0.15<br>0.1<br>0.07<br>0.07 | 2 39  | W.                                            |       |
| 1520  | Sept. 17     | 4 51                  | 4 54.6           | 0.06         | 4 58                  | 5 5.4<br>5 8             | 0.07<br>0.07         | 5 10                  | 5 10.8           | 0.1          | 5 11.7            | 5 13<br>5 15.3                                                     | 0.2<br>0.65                                       | 5 27.8<br>5 34.5<br>5 52.5<br>6 38<br>6 41.3                            | 0.15<br>0.1<br>0.07<br>0.05<br>0.05                         | 2 28  | W.                                            |       |
| 1531  | Sept. 21     | 5 57.4                | 6 1.9            | 0.03         | 6 5.7                 | 6 7.3<br>6 11.1          | 0.02<br>0.02         | 6 17.1                | 6 18.3           | 0.02         | 6 19.1            | 6 21                                                               | 0.1                                               | 6 42.5                                                                  | 0.02                                                        | 1 29  | W.                                            |       |
| 1532  | Sept. 21     | 7 51.7                | 7 53.3           | 0.02         | 8 0                   | 8 6.7                    | 0.03                 |                       |                  |              | 8 13.1            | 8 23.1                                                             | 0.1                                               | 8 33.5<br>8 45.6                                                        | 0.02<br>0.02                                                | 1 9   | W.                                            |       |
| 1537  | Sept. 22     | 5 8.9                 | 5 11.1<br>5 14.5 | 0.03<br>0.03 | 5 17                  | 5 18.2<br>5 25.5<br>5 29 | 0.05<br>0.04<br>0.04 | 5 35.1                | 5 35.4<br>5 37.7 | 0.02<br>0.02 | 5 39.4            | 5 41.9<br>5 46.5                                                   | 0.35<br>0.2                                       | 5 53.6<br>5 56.2<br>6 4.7<br>6 51.3<br>7 52.3                           | 0.04<br>0.06<br>0.05<br>0.05<br>0.02                        | 3 43  | W.                                            |       |
| [1549 | Sept. 27     | 6 5                   | 6 7.4            | 0.05         | 6 10                  | 6 11.5                   | 0.03                 |                       |                  |              | 6 13.8            | 6 22.7                                                             | 0.1                                               | 6 36.2                                                                  | 0.04                                                        | 0 56  | N.]                                           |       |
| 1553  | Oct. 9       | 10 31.7               | 10 33.3          | Mic          | 10 33.8               | 10 34.6                  | 0.02                 |                       |                  |              | 10 35.1           | 10 36.9<br>10 38.9                                                 | 0.03<br>Mic                                       | 10 51.5                                                                 | Mic                                                         | 0 23  | N.                                            |       |

| No.  | Date<br>1911 | Preliminary Phase     |                    |              | Second Phase          |                          |                   | Warning Phase         |         |      | Principal Phase   |                                       |                             | Aftershock                                               |                                            | Total<br>Duration | Notes                                               |
|------|--------------|-----------------------|--------------------|--------------|-----------------------|--------------------------|-------------------|-----------------------|---------|------|-------------------|---------------------------------------|-----------------------------|----------------------------------------------------------|--------------------------------------------|-------------------|-----------------------------------------------------|
|      |              | Commence-<br>ment (P) | Maximum            | a            | Commence-<br>ment (S) | Maximum                  | a                 | Commence-<br>ment (L) | Maximum | a    | Commence-<br>ment | Maximum<br>(M)                        | a                           | Maximum                                                  | a                                          |                   |                                                     |
|      |              | H M                   | H M                | MM           | H M                   | H M                      | MM                | H M                   | H M     | MM   | H M               | H M                                   | MM                          | H M                                                      | MM                                         | H M               |                                                     |
| 1562 | Oct. 10      | 13 32.1               | 13 36.5            | 0.02         | 13 38.2               | 13 40<br>13 44.7         | 0.04<br>0.03      | 13 46.5               | 13 47.6 | 0.1  | 13 48.8           | 13 50.3<br>13 52.4<br>13 55<br>14 1.4 | 0.4<br>0.15<br>0.25<br>0.25 | 14 12<br>14 15<br>14 22<br>14 26.2<br>14 33.4<br>15 22.5 | 0.03<br>0.02<br>0.02<br>Mic<br>0.02<br>Mic | 1 54              | W.                                                  |
| 1569 | Oct. 13      | 2 53.4                | 2 54<br>2 58.2     | Mic<br>Mic   | 3 1.3                 | 3 6.9<br>3 15.8          | Mic<br>0.02       |                       |         |      | 3 19.1            | 3 26.5<br>3 31.3                      | 0.8<br>0.3                  | 3 38.2<br>3 45.2                                         | 0.03<br>0.03                               | 1 15              | W.                                                  |
| 1571 | Oct. 14      | 6 46.5                | 6 48.3             | 0.02         | 6 53                  | 6 54.4                   | 0.02              |                       |         |      | 7 2               | 7 3.2<br>7 6.8                        | 0.1<br>0.05                 | 7 24.6<br>7 31.6                                         | 0.02<br>Mic                                | 0 48              | W.                                                  |
| 1573 | Oct. 14      | 12 41.7               | 12 42.3<br>12 44.1 | Mic<br>Mic   | 12 47.4               | 12 51.8<br>13 9          | 0.02<br>0.03      | 13 11.5               | 13 12.4 | 0.07 | 13 13.4           | 13 14.2<br>13 20.6                    | 0.4<br>0.85                 | 13 32<br>13 40.5<br>14 2.5                               | 0.15<br>0.2<br>0.05                        | 1 49              | N.                                                  |
| 1576 | Oct. 14      | 16 56                 | 16 59              | 0.04         | 17 4.5                | 17 13<br>17 18.5         | 0.03<br>0.04      | 17 21.2               | 17 22   | 0.03 | 17 23.2           | 17 24<br>17 27.2<br>17 32.1           | 0.06<br>0.1<br>0.3          | 17 39.6<br>17 54.8<br>18 16.5                            | 0.1<br>0.1<br>0.1                          | 1 30              | N.                                                  |
| 1577 | Oct. 14-15   | 23 42                 | 23 47.8            | Mic          | 23 50.6               |                          | Mic               | 23 54.2               | 23 54.4 | 0.05 | 23 55.2           | 23 59.1<br>0 3.3<br>0 5.8<br>0 8.8    | 1.0<br>0.2<br>0.1<br>0.05   | 0 13.8<br>0 25.3<br>0 48.6<br>1 9.5                      | 0.02<br>0.03<br>Mic<br>Mic                 | 1 33              | W.                                                  |
|      |              | 23 42                 | 23 43.7<br>23 48.9 | Mic<br>0.02  | 23 50                 | 23 52.4                  | 0.04              | 23 57.3               | 23 57.9 | 0.1  | 23 58.3           | 23 59.8<br>0 1.2                      | 0.85<br>1.0                 | 0 37                                                     | 0.15                                       | 1 25              | N.                                                  |
| 1580 | Oct. 15      | 12 29                 | 12 32.6            | 0.02         | 12 33.4               | 12 35.2                  | 0.02              | 12 36.8               |         |      | 12 37.3           | 12 38.8<br>12 45                      | 0.03<br>0.15                | 12 53.8                                                  | 0.06                                       | 0 35              | N.                                                  |
| 1583 | Oct. 16      | 0 6.4                 | 0 10.2             | Mic          | 0 12.2                | 0 13<br>0 18.4<br>0 21.3 | Mic<br>Mic<br>Mic |                       |         |      | 0 24.3            | 0 28.2                                | 0.03                        | 0 34.5<br>0 50.5                                         | Mic<br>Mic                                 | 0 50              | W.                                                  |
| 1585 | Oct. 17      | 10 11.5               | 10 12.3            | Mic          | 10 20                 | 10 28<br>10 37.3         | Mic<br>Mic        |                       |         |      | 10 45.2           | 10 46.4<br>10 53.2<br>10 55.7         | 0.02<br>Mic<br>Mic          |                                                          |                                            |                   | W. (Period of W.<br>boom, 10 secs.<br>Swing damped) |
| 1586 | Oct. 17      | 12 20.6               | 12 21              | 0.02         | 12 23.7               | 12 24.7                  | Mic               |                       |         |      | 12 36.3           | 12 41.2<br>12 52.7<br>12 54           | 0.02<br>0.02<br>Mic         |                                                          |                                            |                   | W.                                                  |
| 1593 | Oct. 19      | 10 20.7               | 10 21.3<br>10 24   | 0.02<br>0.02 | 10 25.7               |                          |                   |                       |         |      |                   | 10 45<br>10 46.7                      | 0.02<br>0.02                |                                                          |                                            |                   | W.                                                  |
| 1594 | Oct. 20      | 18 37.7               | 18 38.6            | 0.02         | 18 41.1               | 18 47.5                  | 0.02              | 18 49.6               | 18 50.2 | 0.03 | 18 52.2           | 18 53.2<br>18 59<br>19 11             | 0.03<br>0.15<br>0.15        |                                                          |                                            | 1 31              | N. (Preceded by<br>small movements)                 |

| No.   | Date<br>1911 | Preliminary Phase     |                    |              | Second Phase          |                             |                      | Warning Phase         |         |      | Principal Phase   |                                                                                    |                                                      | Aftershock.                                     |                                  | Total<br>Duration | Notes                                                                  |
|-------|--------------|-----------------------|--------------------|--------------|-----------------------|-----------------------------|----------------------|-----------------------|---------|------|-------------------|------------------------------------------------------------------------------------|------------------------------------------------------|-------------------------------------------------|----------------------------------|-------------------|------------------------------------------------------------------------|
|       |              | Commence-<br>ment (P) | Maximum            | a            | Commence-<br>ment (S) | Maximum                     | a                    | Commence-<br>ment (L) | Maximum | a    | Commence-<br>ment | Maximum<br>(M)                                                                     | a                                                    | Maximum                                         | a                                |                   |                                                                        |
|       |              | H M                   | H M                | MM           | H M                   | H M                         | MM                   | H M                   | H M     | MM   | H M               | H M                                                                                | MM                                                   | H M                                             | MM                               | H M               |                                                                        |
| 1599  | Oct. 22      | 22 27.5               | 22 28.8            | 0.02         | 22 34.2               | 22 35.1                     |                      |                       |         |      | 22 43.7           | 22 46.8<br>22 48                                                                   | 0.02<br>0.03                                         |                                                 |                                  | 0 54              | W.                                                                     |
| 1604  | Oct. 24      | 0 43.2                | 0 50               | 0.03         | 0 52.2                | 0 55.7<br>0 57.4<br>1 19.3  | 0.03<br>0.03<br>0.03 | 1 31.5                |         |      |                   | 1 36.6<br>1 39.6<br>1 42                                                           | 0.1<br>0.07<br>0.1                                   | 1 55<br>2 28                                    | 0.07<br>0.03                     | 1 49              | N.                                                                     |
| 1628  | Oct. 29      | 18 34.6               | 18 36.4            | 0.03         | 18 43.6               | 18 51                       | 0.03                 |                       |         |      | 18 59             | 19 1<br>19 2.3<br>19 8.7<br>19 13                                                  | 0.1<br>0.15<br>0.2<br>0.25                           | 19 54.3                                         | 0.03                             | 1 36              | N.                                                                     |
| 1632  | Nov. 1       |                       |                    |              | 9 47                  | 9 47.2                      | 0.1                  | 10 0.5                |         |      | 10 2              | 10 9<br>10 10.6<br>10 15                                                           | 0.1<br>0.05<br>0.03                                  | 10 19<br>10 28.7<br>11 16.5<br>12 16.2          | 0.05<br>0.1<br>0.07<br>0.05      | 2 32              | W. (P. during change<br>of lamps)                                      |
| 1633  | Nov. 2       | 2 3.4                 | 2 3.9              | 0.03         | 2 10.3                | 2 10.7                      | 0.02                 |                       |         |      | 2 24.2            | 2 32.7                                                                             | Mic                                                  |                                                 |                                  |                   | W.                                                                     |
| [1634 | Nov. 2       | 8 7.3                 | 8 7.5<br>8 9.4     | ?<br>?       |                       |                             |                      |                       |         |      |                   | 8 19.6                                                                             | Mic                                                  |                                                 |                                  |                   | W.]                                                                    |
| 1662  | Nov. 13      | 16 35                 | 16 38.8<br>16 40.7 | 0.03<br>0.03 | 16 43.1               | 16 48.4<br>16 52<br>16 55.5 | 0.04<br>0.04<br>0.05 | 16 56.9               | 16 58.9 | 0.05 | 16 59.8           | 17 1.7<br>17 5<br>17 8.5<br>17 16.2<br>17 21.2<br>17 26.4                          | 0.3<br>0.4<br>0.3<br>0.5<br>0.35<br>0.4              | 17 36<br>17 39<br>17 52.5                       | 0.04<br>0.06<br>0.02             | 1 29              | N.                                                                     |
| 1666  | Nov. 16      | 21 27.9               | 21 28.1            | 0.8          | 21 29.2               | 21 29.3                     | 0.6                  | 21 29.5               | 21 30.1 | 1.0  | 21 30.1           | 21 31.3<br>21 32.1<br>21 32.7<br>21 33.1<br>21 34<br>21 35.3<br>21 35.9<br>21 37.1 | 3.0<br>5.0<br>5.6<br>3.5<br>4.1<br>2.0<br>1.5<br>1.6 | 21 38<br>21 39<br>21 39.6<br>21 41.6<br>21 43.5 | 0.9<br>1.0<br>1.3<br>1.0<br>0.75 | 0 20              | W. Intermaximal<br>lulls H M MM<br>21 33.6 —<br>21 37.4 —<br>21 38.3 — |
| 1673  | Nov. 20      | 13 58.2               | 13 58.7<br>14 2.5  | 0.03<br>0.03 | 14 5.7                | 14 14.5                     | 0.3                  | 14 31                 | 14 32.7 | 0.1  | 14 33.5           | 14 36.9<br>14 41<br>14 45                                                          | 0.3<br>0.4<br>0.5                                    | 14 51.3<br>15 5<br>15 26.8<br>15 36.2           | 0.1<br>0.02<br>0.03<br>0.02      | 1 41              | N.                                                                     |
| 1704  | Nov. 28      | 16 51.2               | 16 52<br>16 55.7   | 0.03<br>0.03 | 16 58                 | 16 59                       | 0.05                 |                       |         |      | 17 1.7            | 17 4.8<br>17 8<br>17 9.6                                                           | 0.05<br>0.1<br>0.07                                  |                                                 |                                  | 0 49              | W.                                                                     |
| 1712  | Nov. 30      | 11 50                 | 11 50.7            | 0.05         | 11 57.9               | 12 3.5                      | 0.03                 |                       |         |      | 12 6.7            | 12 14.4                                                                            | 0.07                                                 |                                                 |                                  | 0 52              | W.                                                                     |
| 1715  | Nov. 30      | 23 56.3               | 23 57.3            | 0.05         | 23 59.8               | 0 2.4                       | 0.05                 |                       |         |      | 0 3.6             | 0 4.5<br>0 12                                                                      | 0.07<br>0.07                                         |                                                 |                                  | 0 33              | W.                                                                     |

| No.   | Date<br>1911 | Preliminary Phase     |         |      | Second Phase          |         |      | Warning Phase         |         |      | Principal Phase   |                |      | Aftershock |      | Total<br>Duration | Notes                         |
|-------|--------------|-----------------------|---------|------|-----------------------|---------|------|-----------------------|---------|------|-------------------|----------------|------|------------|------|-------------------|-------------------------------|
|       |              | Commence-<br>ment (P) | Maximum | a    | Commence-<br>ment (S) | Maximum | a    | Commence-<br>ment (L) | Maximum | a    | Commence-<br>ment | Maximum<br>(M) | a    | Maximum    | a    |                   |                               |
|       |              | H M                   | H M     | MM   | H M                   | H M     | MM   | H M                   | H M     | MM   | H M               | H M            | MM   | H M        | MM   | H M               |                               |
| 1736  | Dec. 4       | 14 27.5               | 14 28.3 | 0.02 | 14 34.3               | 14 42.9 | 0.03 | 14 49.8               |         |      | 14 51.5           | 14 56.1        | 0.25 | 15 14.5    | 0.1  | 1 33              | N.                            |
| [1737 | Dec. 4       | 20 2.6                |         |      | 20 5.3                | 20 6    | 0.07 |                       |         |      | 20 10.3           | 20 10.3        | 0.2  | 20 17.7    | 0.1  | 0 20              | N.] Doubtful.                 |
| [1750 | Dec. 6       | 22 55.7               | 22 56.6 | 0.04 | 23 1.9                | 23 14.4 | 0.03 | 23 18.4               |         |      | 23 21.5           | 23 30          | 0.2  | 23 40      | 0.02 |                   | N.] „                         |
|       |              |                       |         |      |                       |         |      |                       |         |      |                   | 23 32.3        | 0.2  |            |      |                   |                               |
|       |              |                       |         |      |                       |         |      |                       |         |      |                   | 23 35.7        | 0.25 |            |      |                   |                               |
| 1751  | Dec. 6-7     | 23 44                 | 23 44.9 | 0.03 | 23 49.2               | 23 52.5 | 0.1  |                       |         |      | 23 54.6           | 23 57.4        | 0.4  | 20 5.2     | 0.2  | 0 43              | N. Ats. also.                 |
|       |              |                       |         |      |                       |         |      |                       |         |      |                   |                |      | 0 26.7     | 0.02 |                   |                               |
| 1767  | Dec. 11      | 11 48.3               | 11 53   | 0.03 | 11 56                 | Ats.    |      | 12 21                 |         |      | 12 25             | 12 29.5        | 0.05 | 12 47      | 0.02 | 1 15              | N. Soot on slit; also<br>Ats. |
| 1798  | Dec. 16      | 19 25.9               | 19 27   | 0.2  | 19 35.5               | 19 37.5 | 0.6  | 19 58.3               | 19 59.1 | 0.15 | 19 59.4           | 20 3           | 1.0  | 20 31.1    | 1.2  | 3 7               | N.                            |
|       |              |                       |         |      |                       | 19 46.6 | 0.25 |                       |         |      |                   | 20 5.2         | 4.35 | 20 36.4    | 1.05 |                   |                               |
|       |              |                       |         |      |                       | 19 50.3 | 0.6  |                       |         |      |                   | 20 9.8         | 5.0  | 20 39.8    | 1.05 |                   |                               |
|       |              |                       |         |      |                       | 19 54.2 | 0.85 |                       |         |      |                   | 20 14          | 6.6  | 20 50.8    | 0.1  |                   |                               |
|       |              |                       |         |      |                       |         |      |                       |         |      |                   | 20 24.6        | 2.5  | 20 57.9    | 0.15 |                   |                               |
|       |              |                       |         |      |                       |         |      |                       |         |      |                   |                |      | 21 15.7    | 0.1  |                   |                               |
|       |              |                       |         |      |                       |         |      |                       |         |      |                   |                |      | 21 27      | 0.1  |                   |                               |
|       |              |                       |         |      |                       |         |      |                       |         |      |                   |                |      | 21 35.3    | 0.1  |                   |                               |
|       |              |                       |         |      |                       |         |      |                       |         |      |                   |                |      | 21 50.3    | 0.03 |                   |                               |
|       |              |                       |         |      |                       |         |      |                       |         |      |                   |                |      | 22 9.5     | 0.05 |                   |                               |
| 1799  | Dec. 17      | 1 48.1                | 1 49.7  | 0.03 | 1 54.9                | 1 58.2  | 0.04 | 2 8                   | 2 9     | 0.03 | 2 9.5             | 2 18.4         | 0.2  | 2 39.8     | 0.08 | 1 9               | N.                            |
|       |              |                       |         |      |                       | 2 6     | 0.03 |                       |         |      |                   |                |      |            |      |                   |                               |
| 1814  | Dec. 20      | 6 2.1                 | 6 3.9   | 0.03 | 6 10.7                | 6 16.5  | 0.09 | 6 37.2                | 6 39    | 0.04 | 6 41.2            | 6 45.9         | 0.65 | 7 1.1      | 0.2  | 3 1               | N.                            |
|       |              |                       |         |      |                       | 6 26.2  | 0.06 |                       |         |      |                   | 6 53.9         | 0.5  | 7 12       | 0.15 |                   |                               |
|       |              |                       |         |      |                       | 6 33    | 0.04 |                       |         |      |                   |                |      | 7 22.2     | 0.15 |                   |                               |
|       |              |                       |         |      |                       |         |      |                       |         |      |                   |                |      | 7 29       | 0.08 |                   |                               |
|       |              |                       |         |      |                       |         |      |                       |         |      |                   |                |      | 7 46.7     | 0.1  |                   |                               |
|       |              |                       |         |      |                       |         |      |                       |         |      |                   |                |      | 8 22.7     | 0.06 |                   |                               |
|       |              |                       |         |      |                       |         |      |                       |         |      |                   |                |      | 8 33.2     | 0.06 |                   |                               |
|       |              |                       |         |      |                       |         |      |                       |         |      |                   |                |      | 8 51.3     | 0.03 |                   |                               |
|       |              |                       |         |      |                       |         |      |                       |         |      |                   |                |      | 8 59.2     | 0.05 |                   |                               |
| 1816  | Dec. 29      | 15 50.7               | 15 54   | 0.03 | 15 57.8               | 15 58.1 | 0.01 | 16 23                 |         |      |                   | 16 32.5        | 0.04 |            |      |                   | W.                            |
| 1817  | Dec. 31      | 6 21.5                | 6 23.6  | 0.02 | 6 33.7                | 6 41.5  | 0.02 | 7 3.2                 |         |      |                   | 7 17.5         | 0.02 |            |      |                   | W.                            |
|       |              |                       |         |      |                       |         |      |                       |         |      |                   | 7 22.5         | 0.02 |            |      |                   |                               |

Intermaximal lulls.

MM  
19 40.6 —  
19 52 —  
20 35 —