

**ANNULAR SOLAR ECLIPSE OF 2012 MAY 20**

**TABLE 4**

**PHYSICAL EPHEMERIS OF THE ANTUMBRAL SHADOW  
ANNULAR SOLAR ECLIPSE OF 2012 MAY 20**

ΔT = 66.7 s

| Universal Time | Central Line |            | Diameter Ratio | Eclipse Obscur. | Sun Alt ° | Sun Azm ° | Path Width km | Major Axis km | Minor Axis km | Umbra Veloc. km/s | Central Durat. |
|----------------|--------------|------------|----------------|-----------------|-----------|-----------|---------------|---------------|---------------|-------------------|----------------|
|                | Latitude     | Longitude  |                |                 |           |           |               |               |               |                   |                |
| 22:09.0        | 21°09.2'N    | 108°42.2'E | 0.9309         | 0.8666          | 0.0       | 68.3      | 324.3         | -             | 258.6         | -                 | 04m22.7s       |
| 22:10          | 23°47.2'N    | 115°20.8'E | 0.9326         | 0.8698          | 6.9       | 70.9      | 318.3         | 2115.0        | 251.6         | 6.207             | 04m29.4s       |
| 22:15          | 27°53.3'N    | 124°29.3'E | 0.9352         | 0.8746          | 17.0      | 75.7      | 307.0         | 827.7         | 241.5         | 2.320             | 04m40.6s       |
| 22:20          | 30°25.9'N    | 129°40.4'E | 0.9366         | 0.8773          | 23.1      | 79.3      | 298.9         | 603.2         | 235.7         | 1.651             | 04m48.1s       |
| 22:25          | 32°28.3'N    | 133°40.3'E | 0.9377         | 0.8794          | 27.8      | 82.7      | 291.9         | 496.9         | 231.3         | 1.338             | 04m54.4s       |
| 22:30          | 34°13.6'N    | 137°03.3'E | 0.9386         | 0.8811          | 31.8      | 86.0      | 285.5         | 432.6         | 227.7         | 1.150             | 05m00.0s       |
| 22:35          | 35°47.2'N    | 140°03.4'E | 0.9394         | 0.8825          | 35.4      | 89.4      | 279.7         | 388.7         | 224.7         | 1.023             | 05m05.1s       |
| 22:40          | 37°12.1'N    | 142°48.3'E | 0.9401         | 0.8837          | 38.5      | 92.9      | 274.4         | 356.8         | 222.1         | 0.932             | 05m09.9s       |
| 22:45          | 38°30.0'N    | 145°22.6'E | 0.9407         | 0.8848          | 41.4      | 96.5      | 269.5         | 332.4         | 219.8         | 0.862             | 05m14.3s       |
| 22:50          | 39°42.0'N    | 147°49.2'E | 0.9412         | 0.8858          | 44.1      | 100.3     | 265.0         | 313.2         | 217.8         | 0.808             | 05m18.5s       |
| 22:55          | 40°48.8'N    | 150°10.4'E | 0.9416         | 0.8866          | 46.6      | 104.4     | 260.9         | 297.7         | 216.0         | 0.765             | 05m22.4s       |
| 23:00          | 41°51.2'N    | 152°27.7'E | 0.9420         | 0.8874          | 48.8      | 108.6     | 257.2         | 285.1         | 214.5         | 0.729             | 05m26.0s       |
| 23:05          | 42°49.3'N    | 154°42.5'E | 0.9424         | 0.8881          | 50.9      | 113.1     | 253.8         | 274.8         | 213.1         | 0.701             | 05m29.3s       |
| 23:10          | 43°43.6'N    | 156°55.7'E | 0.9427         | 0.8886          | 52.8      | 117.9     | 250.7         | 266.2         | 211.9         | 0.677             | 05m32.4s       |
| 23:15          | 44°34.2'N    | 159°08.1'E | 0.9429         | 0.8891          | 54.5      | 123.0     | 248.0         | 259.1         | 210.8         | 0.657             | 05m35.2s       |
| 23:20          | 45°21.2'N    | 161°20.3'E | 0.9432         | 0.8896          | 56.0      | 128.5     | 245.6         | 253.2         | 209.9         | 0.641             | 05m37.7s       |
| 23:25          | 46°04.8'N    | 163°33.0'E | 0.9434         | 0.8900          | 57.3      | 134.2     | 243.5         | 248.4         | 209.1         | 0.628             | 05m39.9s       |
| 23:30          | 46°45.1'N    | 165°46.6'E | 0.9435         | 0.8903          | 58.5      | 140.2     | 241.6         | 244.6         | 208.5         | 0.617             | 05m41.8s       |
| 23:35          | 47°21.9'N    | 168°01.5'E | 0.9437         | 0.8905          | 59.4      | 146.6     | 240.1         | 241.6         | 208.0         | 0.609             | 05m43.4s       |
| 23:40          | 47°55.5'N    | 170°18.0'E | 0.9438         | 0.8907          | 60.1      | 153.2     | 238.8         | 239.4         | 207.6         | 0.604             | 05m44.6s       |
| 23:45          | 48°25.6'N    | 172°36.5'E | 0.9438         | 0.8908          | 60.6      | 160.0     | 237.9         | 238.0         | 207.3         | 0.600             | 05m45.5s       |
| 23:50          | 48°52.3'N    | 174°57.2'E | 0.9439         | 0.8909          | 60.8      | 167.0     | 237.2         | 237.2         | 207.1         | 0.599             | 05m46.1s       |
| 23:55          | 49°15.6'N    | 177°20.4'E | 0.9439         | 0.8909          | 60.9      | 174.1     | 236.7         | 237.1         | 207.1         | 0.599             | 05m46.4s       |
| 00:00          | 49°35.2'N    | 179°46.2'E | 0.9439         | 0.8909          | 60.6      | 181.2     | 236.6         | 237.8         | 207.2         | 0.601             | 05m46.3s       |
| 00:05          | 49°51.2'N    | 177°45.2'W | 0.9438         | 0.8908          | 60.2      | 188.2     | 236.7         | 239.1         | 207.4         | 0.606             | 05m45.8s       |
| 00:10          | 50°03.5'N    | 175°13.7'W | 0.9437         | 0.8906          | 59.5      | 195.1     | 237.1         | 241.1         | 207.7         | 0.612             | 05m44.9s       |
| 00:15          | 50°11.8'N    | 172°39.0'W | 0.9436         | 0.8904          | 58.6      | 201.9     | 237.8         | 244.0         | 208.1         | 0.621             | 05m43.8s       |
| 00:20          | 50°16.1'N    | 170°01.0'W | 0.9435         | 0.8902          | 57.4      | 208.4     | 238.7         | 247.7         | 208.7         | 0.633             | 05m42.2s       |
| 00:25          | 50°16.1'N    | 167°19.5'W | 0.9433         | 0.8898          | 56.1      | 214.7     | 240.0         | 252.3         | 209.4         | 0.647             | 05m40.3s       |
| 00:30          | 50°11.8'N    | 164°34.3'W | 0.9431         | 0.8894          | 54.6      | 220.8     | 241.6         | 258.0         | 210.3         | 0.664             | 05m38.0s       |
| 00:35          | 50°02.8'N    | 161°45.2'W | 0.9428         | 0.8889          | 52.9      | 226.6     | 243.5         | 264.9         | 211.2         | 0.685             | 05m35.4s       |
| 00:40          | 49°48.9'N    | 158°51.7'W | 0.9425         | 0.8884          | 51.0      | 232.3     | 245.7         | 273.2         | 212.4         | 0.710             | 05m32.5s       |
| 00:45          | 49°29.7'N    | 155°53.5'W | 0.9422         | 0.8878          | 49.0      | 237.7     | 248.3         | 283.3         | 213.7         | 0.741             | 05m29.2s       |
| 00:50          | 49°04.9'N    | 152°49.8'W | 0.9418         | 0.8870          | 46.8      | 242.9     | 251.3         | 295.5         | 215.2         | 0.777             | 05m25.6s       |
| 00:55          | 48°34.0'N    | 149°39.8'W | 0.9414         | 0.8862          | 44.3      | 247.9     | 254.7         | 310.6         | 216.9         | 0.822             | 05m21.6s       |
| 01:00          | 47°56.2'N    | 146°22.1'W | 0.9409         | 0.8853          | 41.7      | 252.8     | 258.6         | 329.2         | 218.8         | 0.878             | 05m17.3s       |
| 01:05          | 47°10.8'N    | 142°54.8'W | 0.9404         | 0.8843          | 38.8      | 257.6     | 263.0         | 352.9         | 221.0         | 0.948             | 05m12.6s       |
| 01:10          | 46°16.5'N    | 139°15.3'W | 0.9397         | 0.8831          | 35.7      | 262.3     | 268.1         | 383.8         | 223.5         | 1.040             | 05m07.6s       |
| 01:15          | 45°11.3'N    | 135°19.0'W | 0.9390         | 0.8817          | 32.2      | 266.9     | 273.8         | 426.1         | 226.4         | 1.166             | 05m02.1s       |
| 01:20          | 43°52.2'N    | 130°58.6'W | 0.9381         | 0.8800          | 28.2      | 271.7     | 280.4         | 487.6         | 229.9         | 1.350             | 04m56.1s       |
| 01:25          | 42°13.4'N    | 126°00.1'W | 0.9370         | 0.8780          | 23.5      | 276.6     | 288.2         | 587.8         | 234.1         | 1.650             | 04m49.3s       |
| 01:30          | 40°01.7'N    | 119°50.4'W | 0.9356         | 0.8754          | 17.7      | 281.9     | 297.8         | 792.3         | 239.7         | 2.266             | 04m41.4s       |
| 01:35          | 36°21.4'N    | 110°07.4'W | 0.9333         | 0.8711          | 8.4       | 289.0     | 312.0         | 1719.1        | 248.9         | 5.076             | 04m30.1s       |
| 01:36.5        | 32°55.0'N    | 101°10.0'W | 0.9312         | 0.8671          | 0.0       | 294.3     | 323.1         | -             | 257.4         | -                 | 04m21.3s       |