

Annular Solar Eclipse: October 14, 2023

On October 14, 2023, an annular (“ring-of-fire type”) solar eclipse will be visible from parts of the United States, Central America, and South America, where skies are clear. An annular eclipse is a central solar eclipse that occurs when the Moon is too far away from Earth to totally block the Sun’s light. A partial solar eclipse can be seen from much of the western hemisphere on October 14. The eclipse will be annular only along a narrow zone, less than 117 miles wide, extending from Oregon and northeastern California to Utah, Arizona, southwestern-most Colorado, New Mexico, Texas, and then Central and South America.

In Colorado the eclipse will be annular southwest of a line extending roughly from near Dove Creek toward Mancos, but most of Colorado will experience a deep partial eclipse, lasting more than two and a half hours. At Montrose, 86% of the Sun’s disk (by area) will be covered by the Moon at 10:33 a.m. MDT. **To observe this eclipse and avoid eye injury or blindness, it will be essential to use safe methods, such as image projection, or to view through safe solar filters. Safe solar filters need to be used on all telescopes, binoculars, and cameras.** These are available from various vendors of astronomical products. See these recommendations from an optometrist:

<http://mreclipse.com/Special/filters.html>

If you want to see the annular phase of the solar eclipse on October 14, 2023, you need to be within the narrow path of annularity. Find info and detailed maps at these sites:

<https://www.greatamericaneclipse.com/october-14-2023>

<https://eclipsophile.com/ase2023/>

http://xjubier.free.fr/en/site_pages/solar_eclipses/ASE_2023_GoogleMapFull.html

The xjubier site works with Google Maps and allows the user to obtain accurate predictions for times, eclipse phase durations, and positions of the Sun for any location. The eclipsophile site includes helpful summaries of October cloudiness and weather prospects along the eclipse path. The entire eclipse will last more than two and a half hours for most of the western United States, but the annular eclipse phase will be relatively brief, between 4 and 5 minutes for the U. S. Maximum duration for the annular phase of the eclipse, 5 minutes and 17 seconds, occurs offshore, east of Nicaragua. The annular phase of the October 14, 2023 eclipse occurs during the morning in the Pacific and Mountain Times Zones and near midday in Texas. At the middle of the annular phase for southwestern U. S. states and Texas, the Sun will be 27 to 50 degrees above the horizon, with solar altitudes increasing to the southeast. Prognoses for cloud-free conditions in October favor southeastern Utah, northeastern Arizona, southwestern-most Colorado, and New Mexico.

Hotels within the path of annularity may book up for this eclipse. Sites at campgrounds within the path of the annular eclipse may also become popular. You could plan to travel into the path of annularity early on eclipse morning. But since this is a morning eclipse for the southwestern U.S., it would be wise to start toward the path of annularity VERY early. A detailed road atlas for the October 14, 2023 annular eclipse is available here:

<https://www.mreclipse.com/pubs/Atlas2023.html>

Annular Solar Eclipse of 2023 Oct 14

Geocentric Conjunction = 17:36:28.8 UT J.D. = 2460232.233667
 Greatest Eclipse = 17:59:21.0 UT J.D. = 2460232.249549

Eclipse Magnitude = 0.9520 Gamma = 0.3752

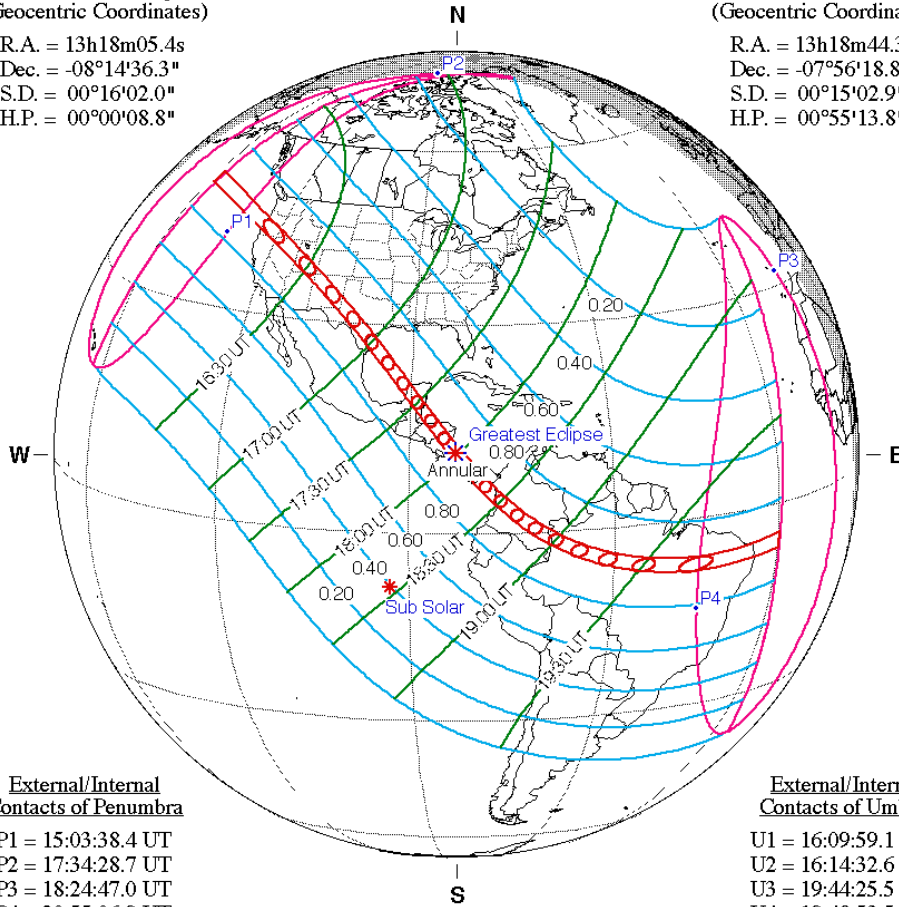
Saros Series = 134 Member = 44 of 71

Sun at Greatest Eclipse
(Geocentric Coordinates)

R.A. = 13h18m05.4s
 Dec. = -08°14'36.3"
 S.D. = 00°16'02.0"
 H.P. = 00°00'08.8"

Moon at Greatest Eclipse
(Geocentric Coordinates)

R.A. = 13h18m44.3s
 Dec. = -07°56'18.8"
 S.D. = 00°15'02.9"
 H.P. = 00°55'13.8"



External/Internal
Contacts of Penumbra

P1 = 15:03:38.4 UT
 P2 = 17:34:28.7 UT
 P3 = 18:24:47.0 UT
 P4 = 20:55:06.9 UT

External/Internal
Contacts of Umbra

U1 = 16:09:59.1 UT
 U2 = 16:14:32.6 UT
 U3 = 19:44:25.5 UT
 U4 = 19:48:53.5 UT

Local Circumstances at Greatest Eclipse

Lat. = 11°21.7'N Sun Alt. = 67.9°
 Long. = 083°04.3'W Sun Azm. = 208.0°
 Path Width = 187.4 km Duration = 05m17.2s

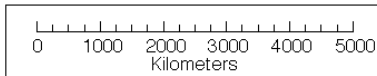
Ephemeris & Constants

Eph. = Newcomb/ILE
 $\Delta T = 80.7$ s
 $k_1 = 0.2724880$
 $k_2 = 0.2722810$
 $\Delta b = 0.0''$ $\Delta l = 0.0''$

Geocentric Libration
(Optical + Physical)

$l = -3.80^\circ$
 $b = -0.48^\circ$
 $c = 20.45^\circ$

Brown Lun. No. = 1247



F. Espenak, NASA's GSFC - Fri, Jul 2,
sunearth.gsfc.nasa.gov/eclipse/eclipse.html