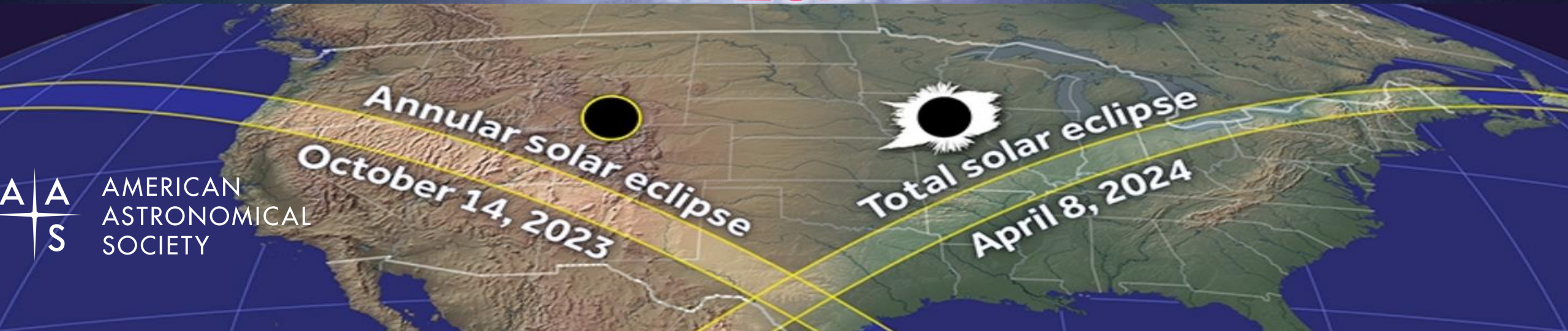


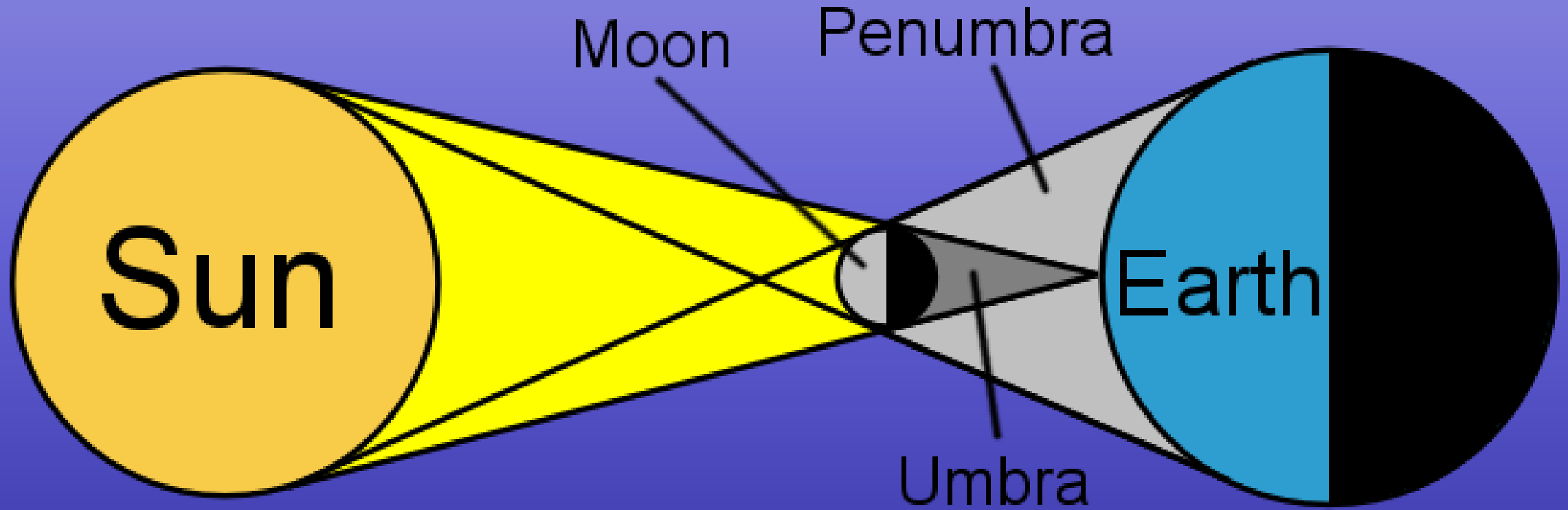
HERE WE GO AGAIN AND AGAIN:

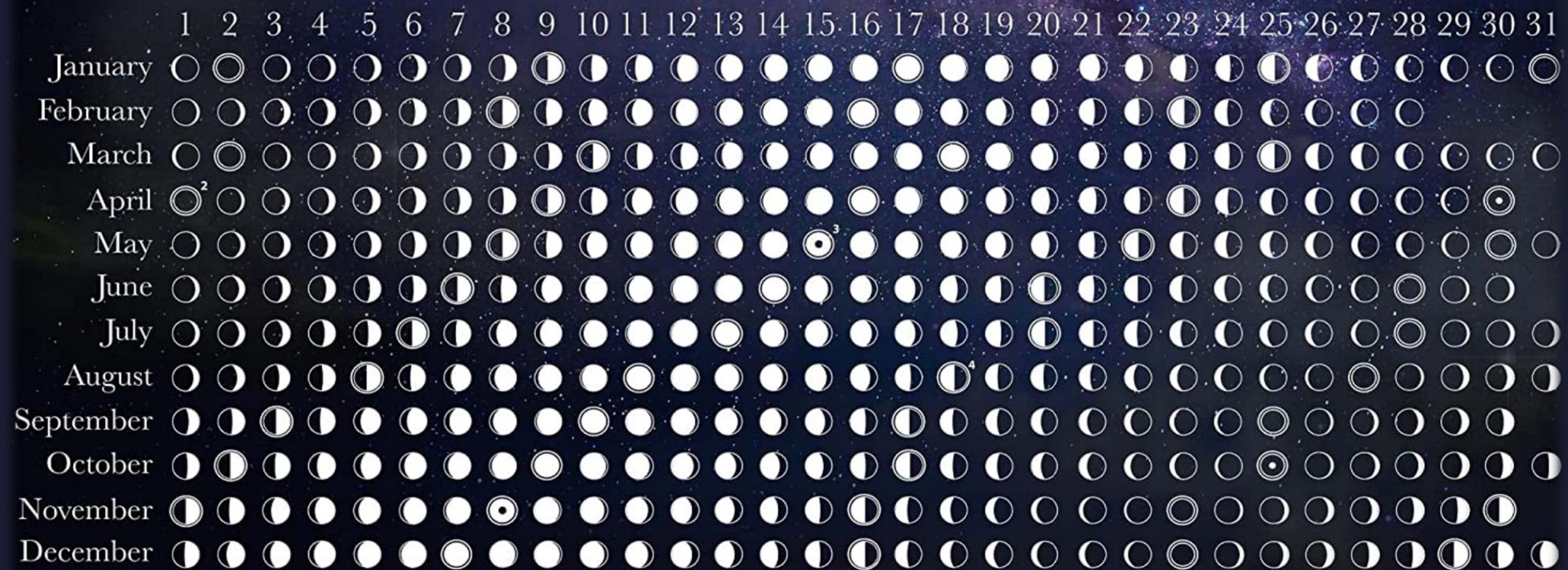


THE GREAT AMERICAN ECLIPSES OF 2023 & 2024

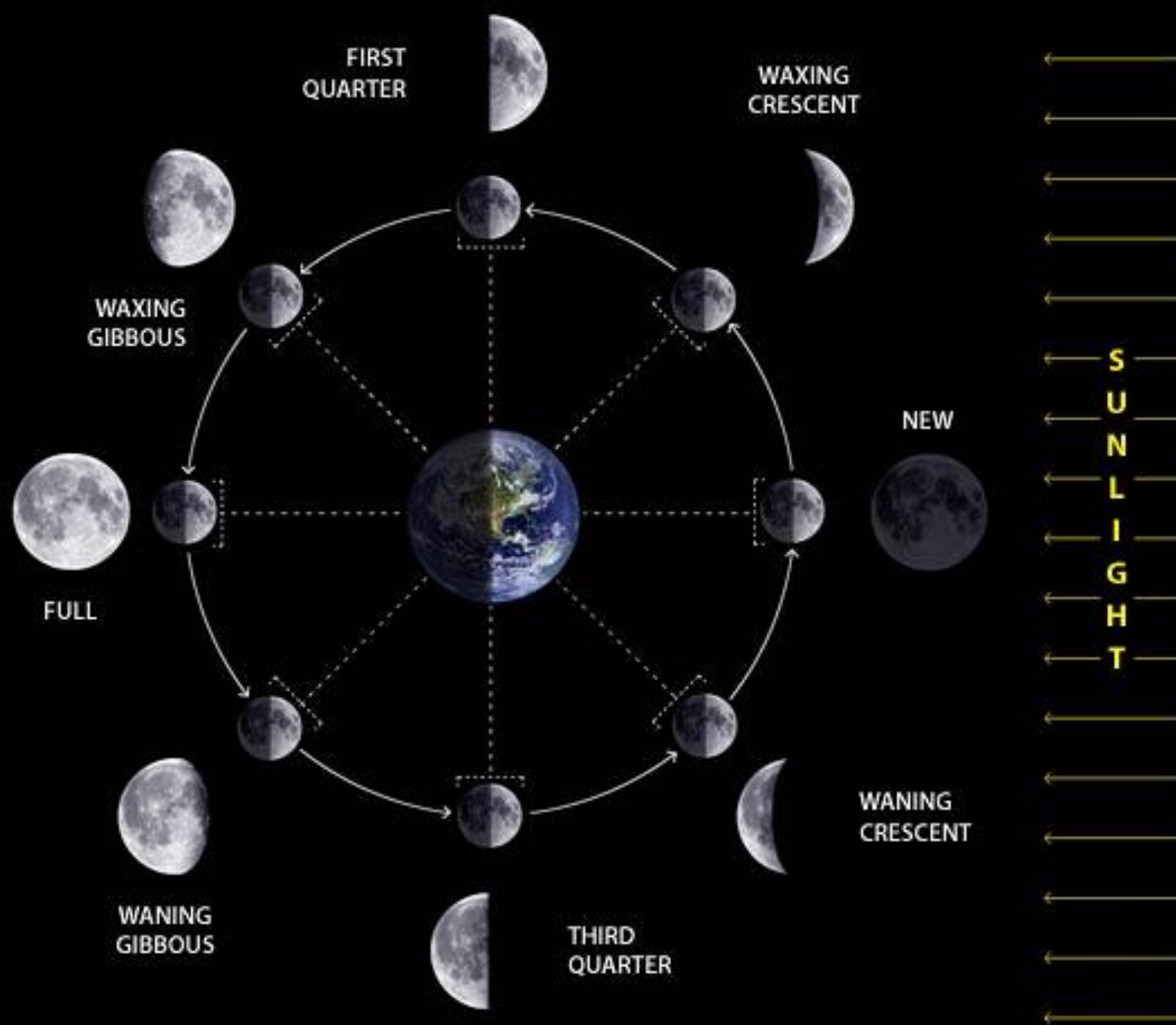


Solar eclipses occur when the Moon gets between the Sun and the Earth

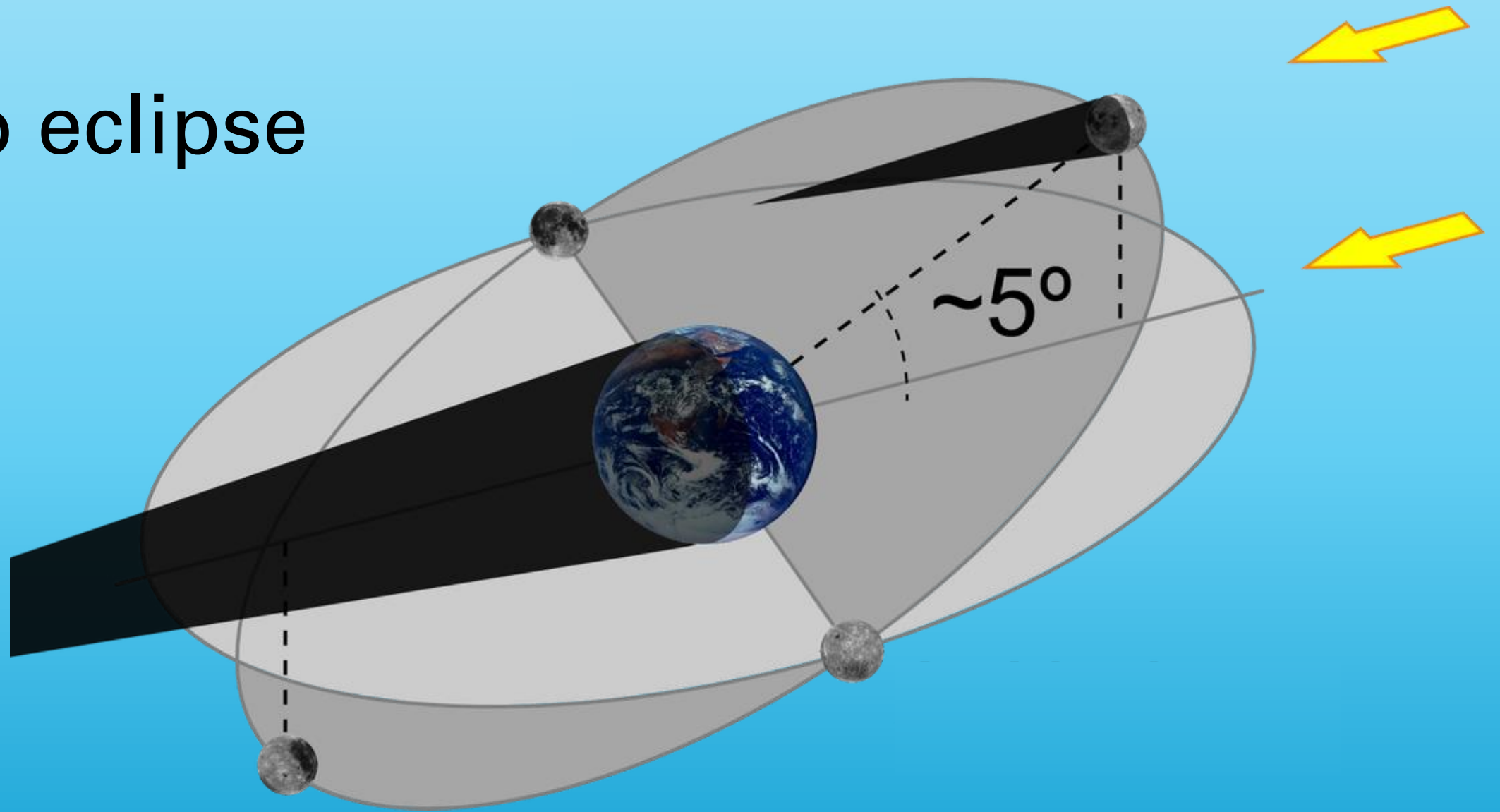




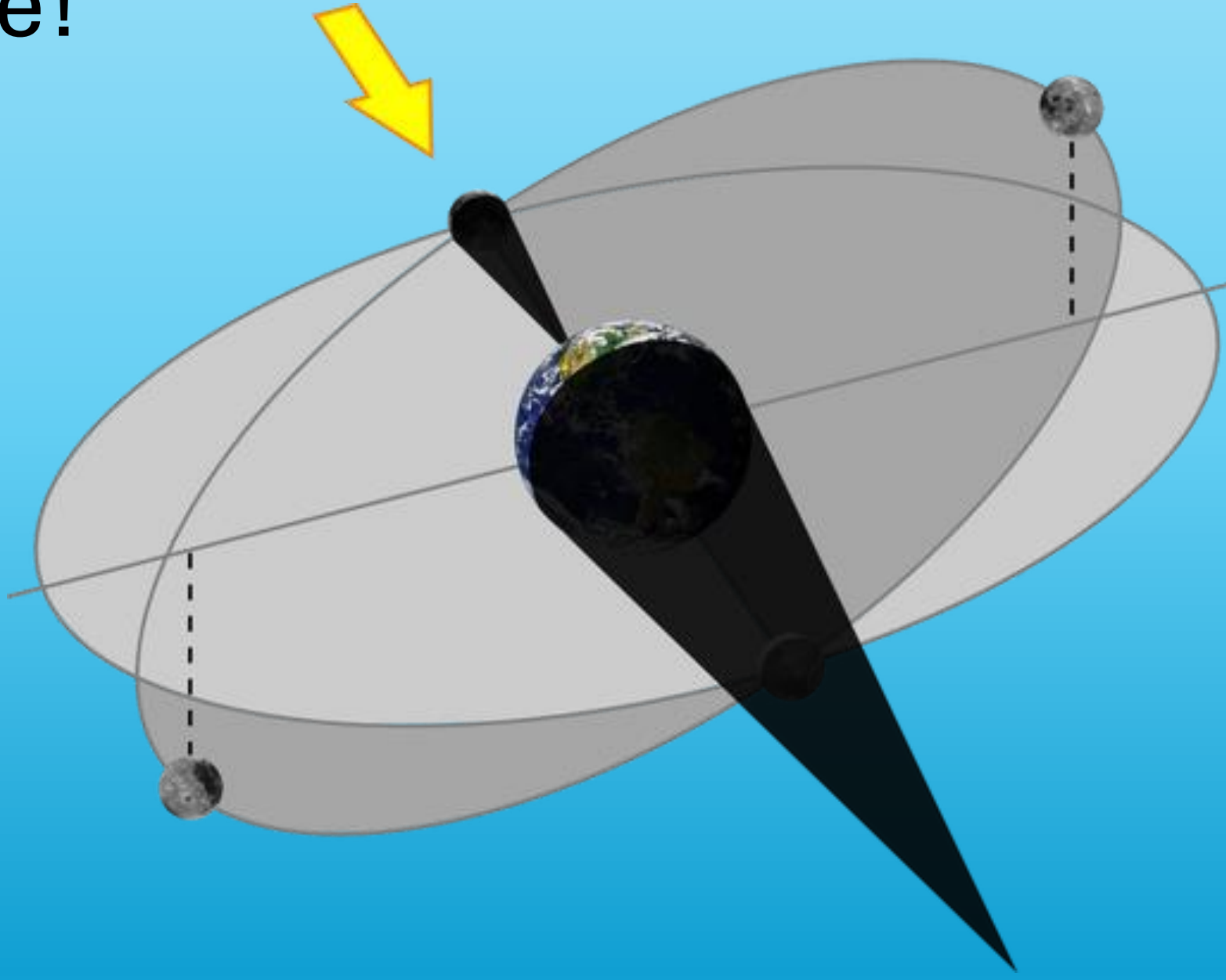
Lunar phases



No eclipse



Eclipse!





The diagram shows the Moon's orbit around Earth. In this configuration, the Moon is positioned directly between the Sun and Earth, which is the alignment required for a solar eclipse.

No Solar Eclipse

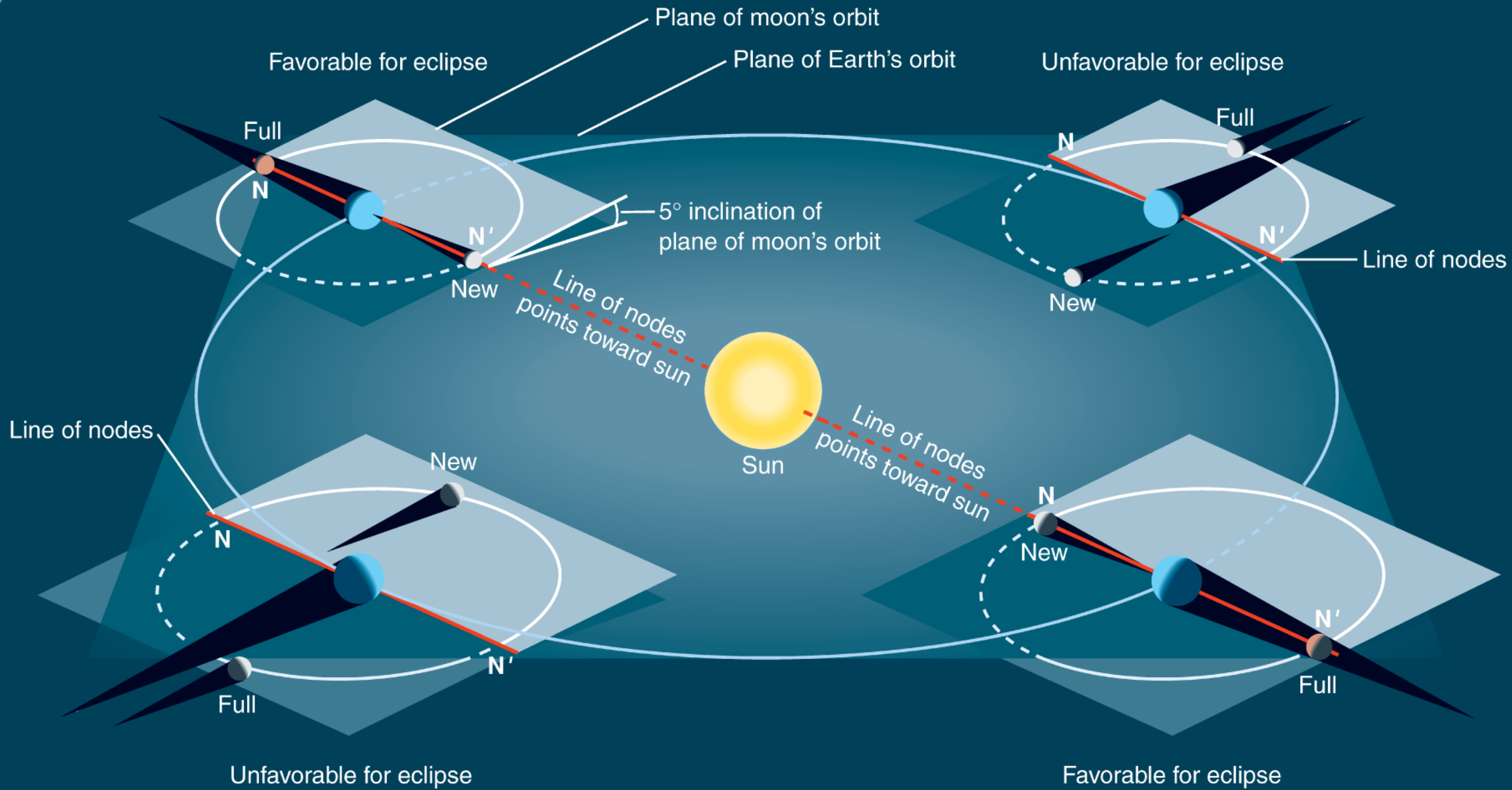


The diagram shows the Moon's orbit around Earth. In this configuration, the Earth is positioned directly between the Sun and the Moon, which is the alignment required for a lunar eclipse.

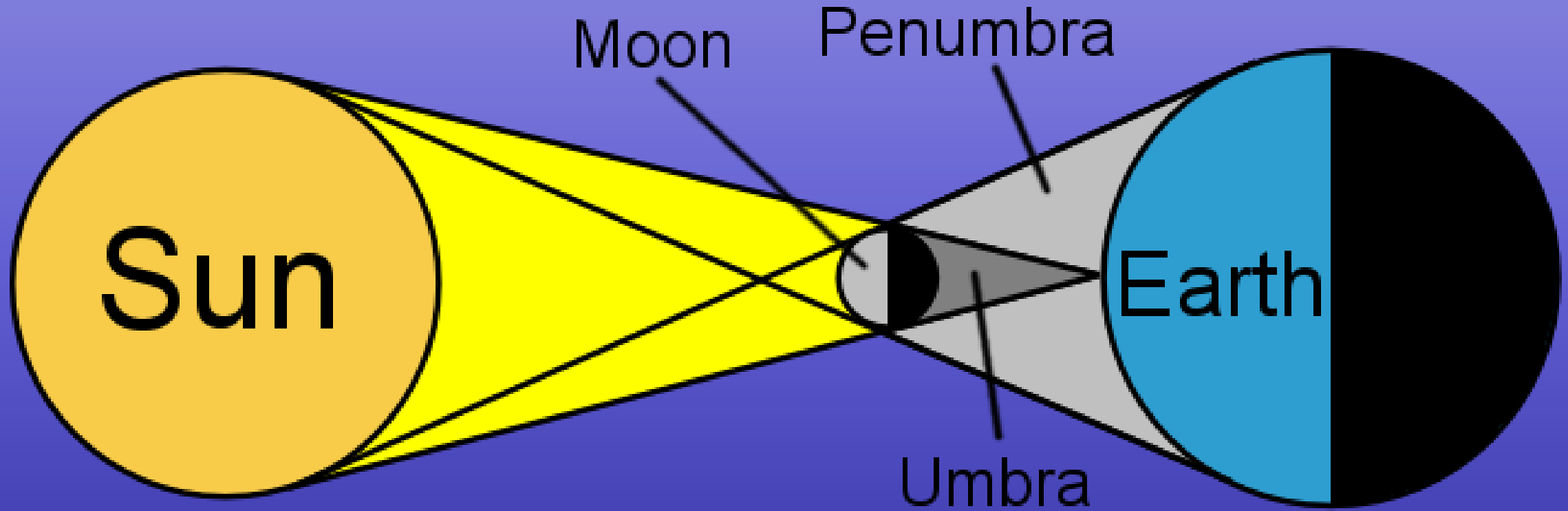
No Lunar Eclipse

Solar Eclipse

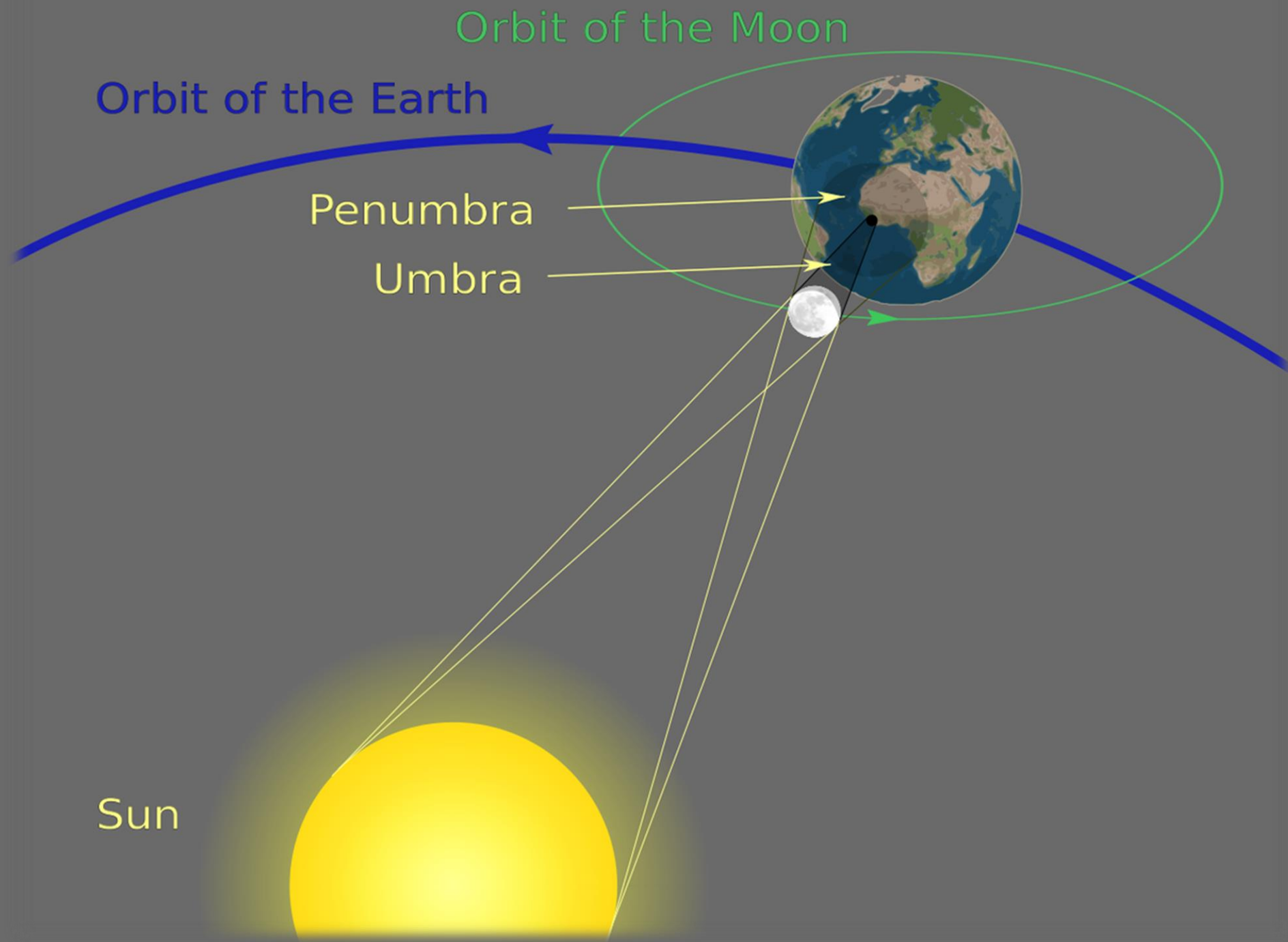
Lunar Eclipse



Solar eclipses occur when the Moon gets between the Sun and the Earth

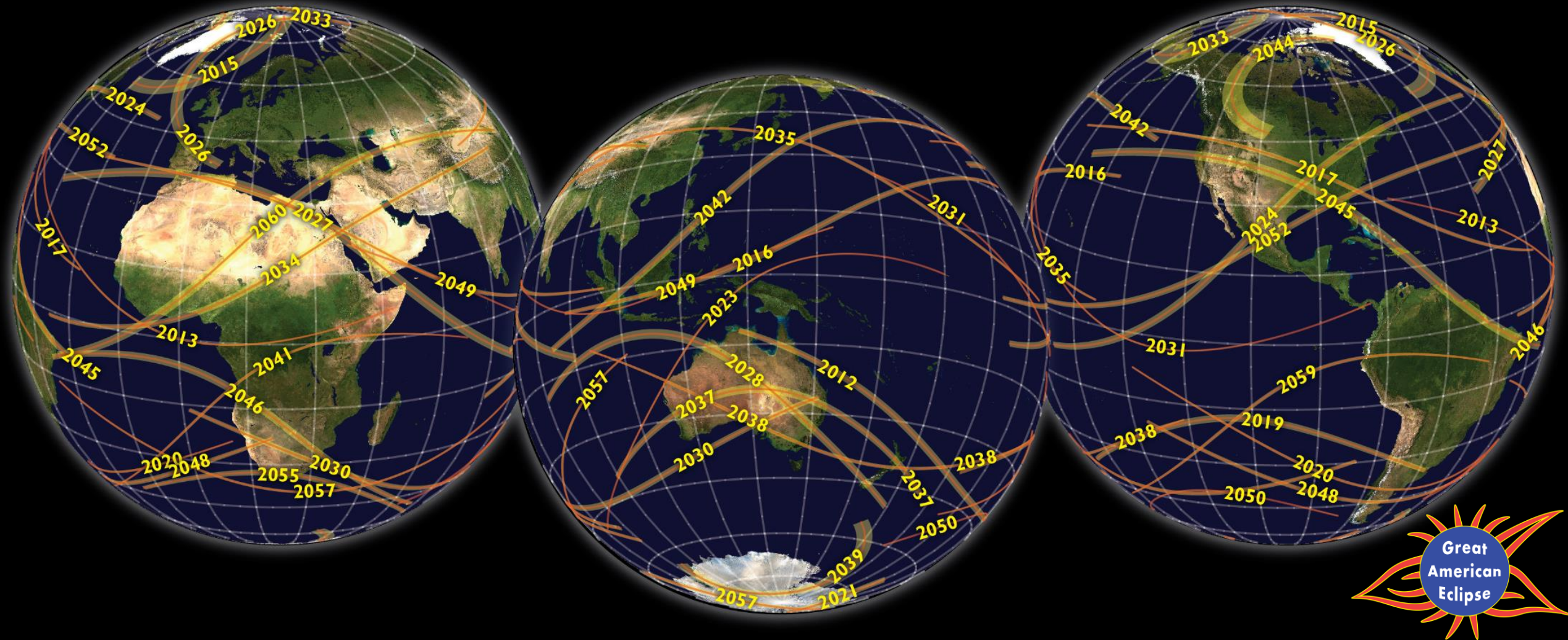


Although the moon orbits the earth ~once per month, an alignment like this only occurs about twice a year

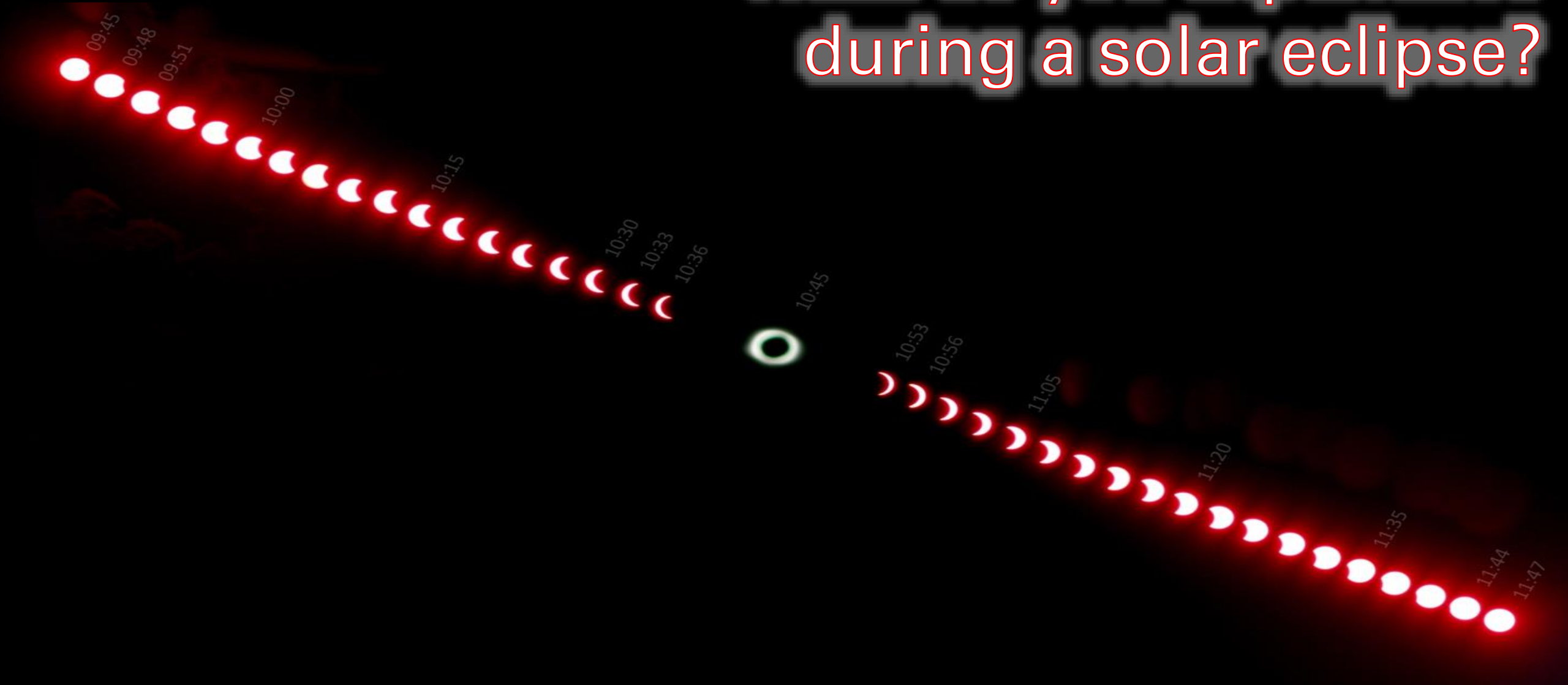


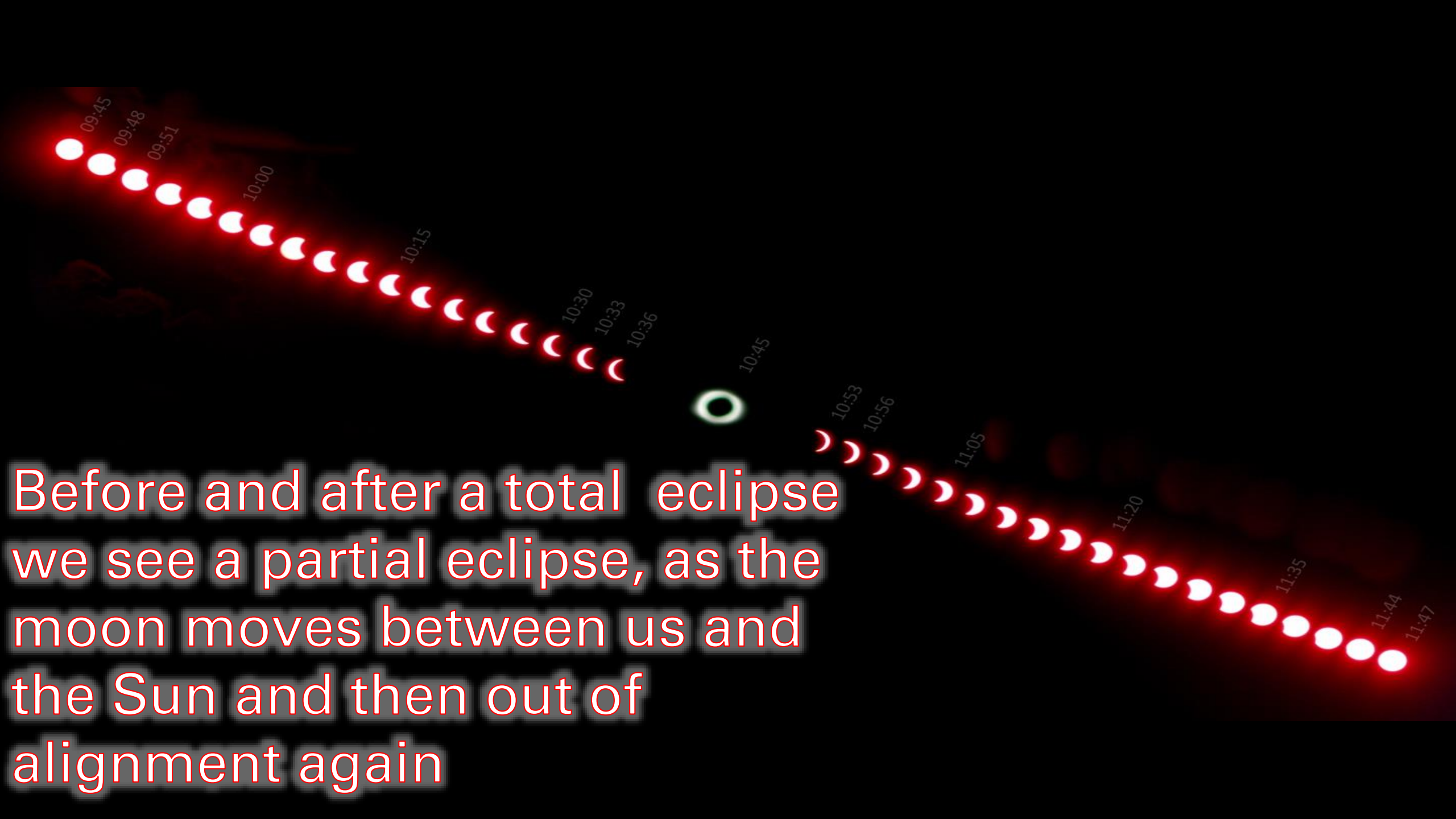
Every total eclipse on the planet in 50 years (2010-2060)

Each total eclipse is seen by one thousandth of the Earth's surface. Most of the planet does not see a total eclipse in 50 years.



What do you experience during a solar eclipse?

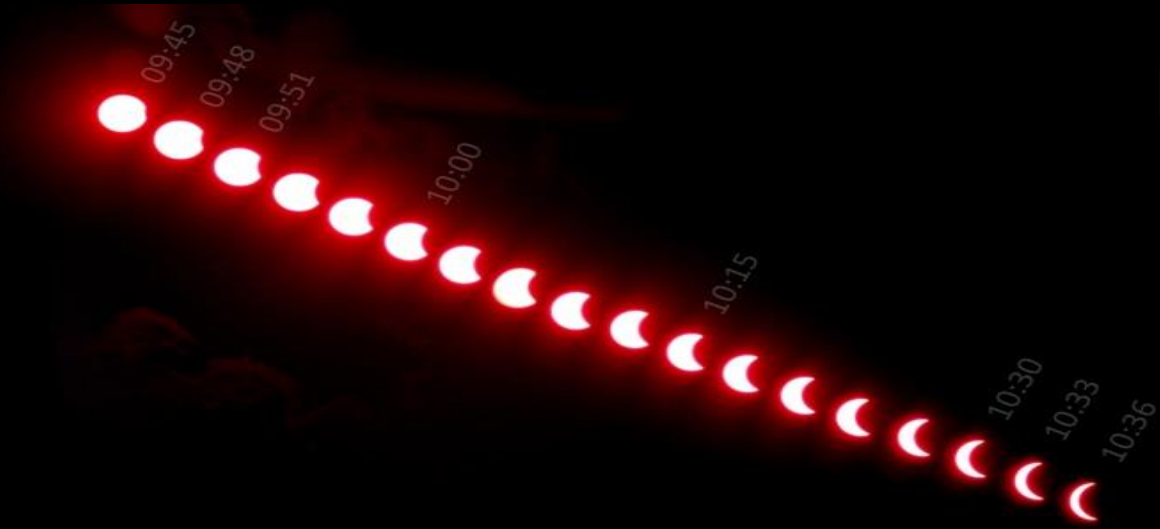




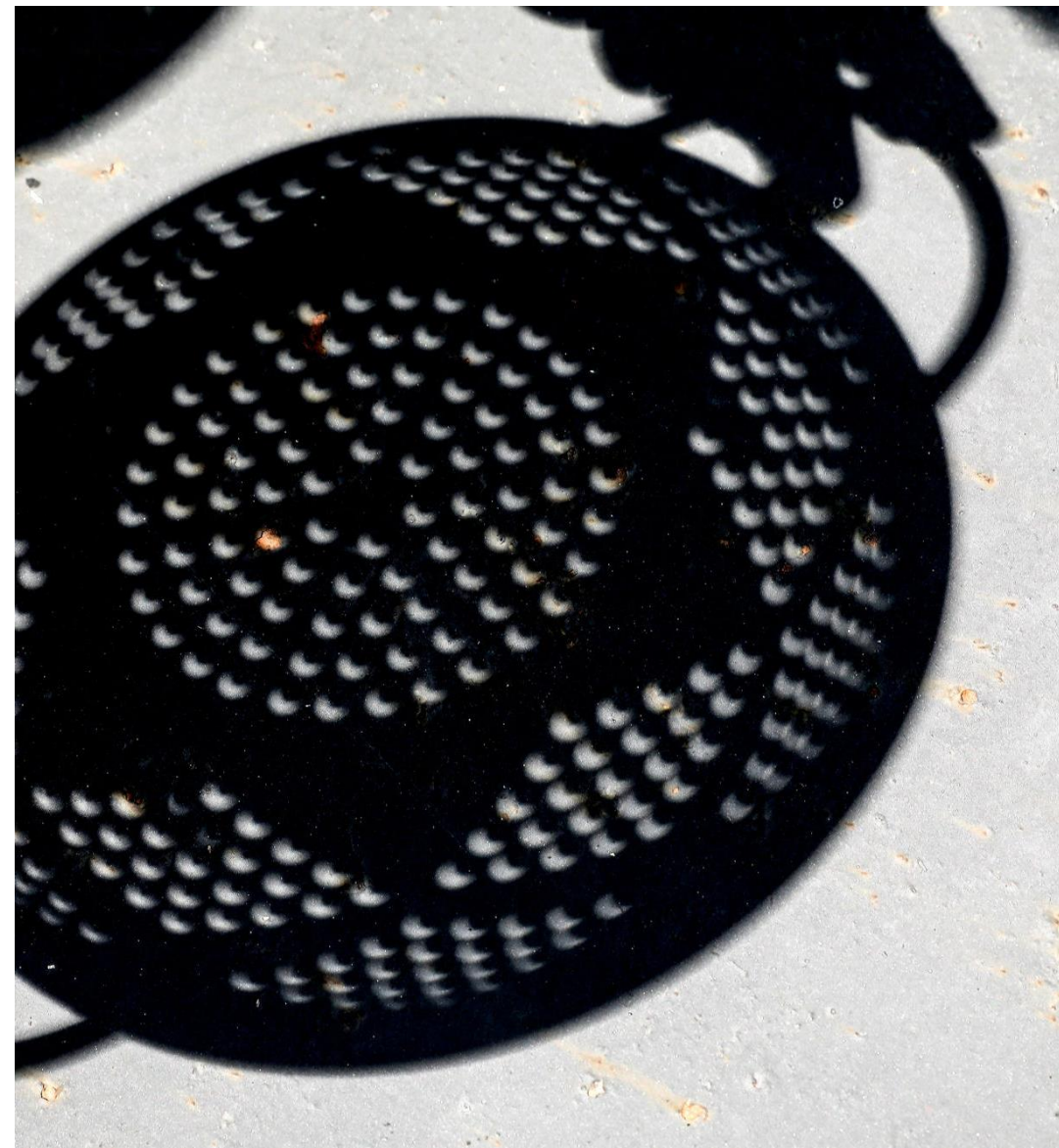
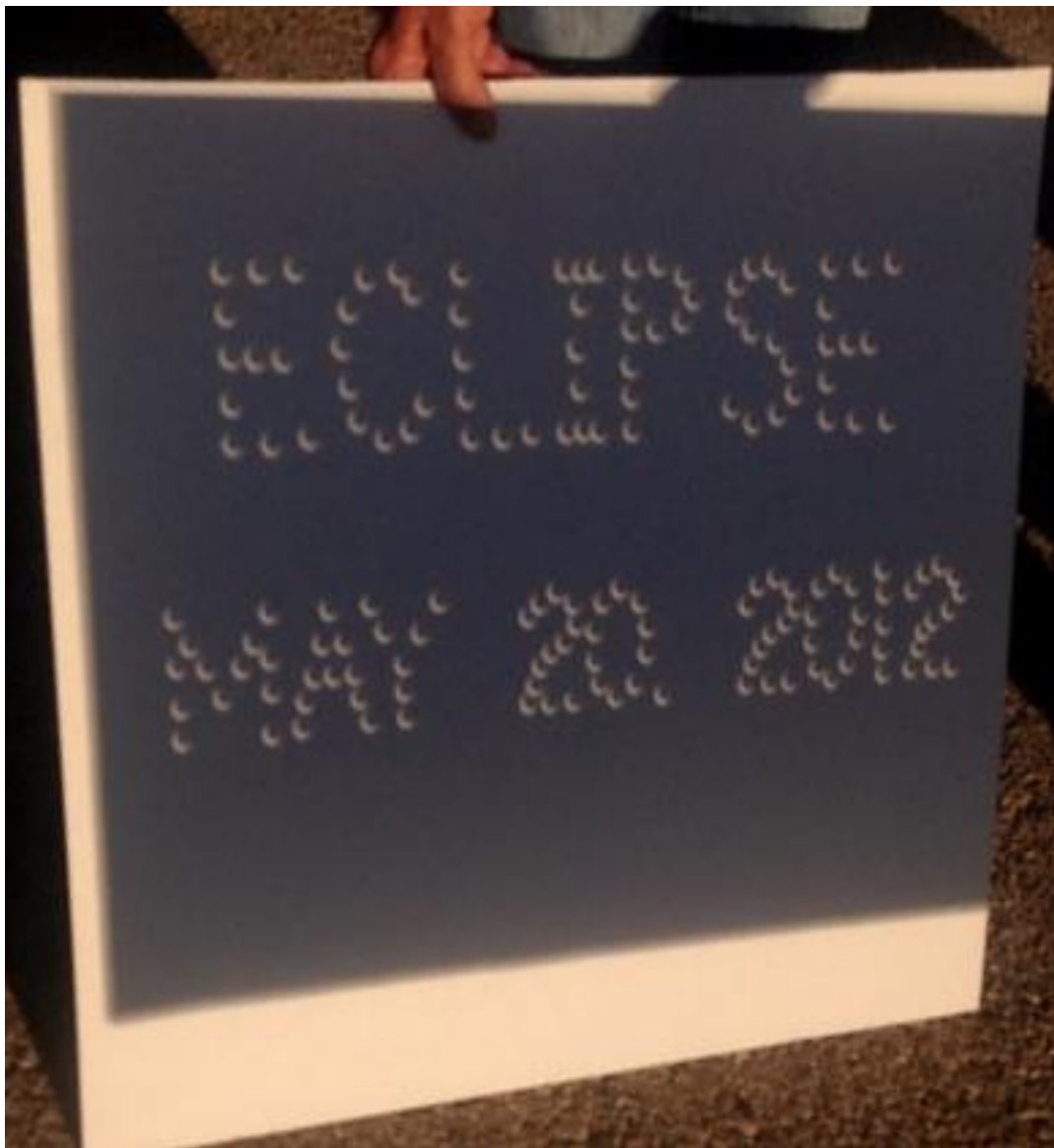
Before and after a total eclipse
we see a partial eclipse, as the
moon moves between us and
the Sun and then out of
alignment again



What do you experience during the partial phase?



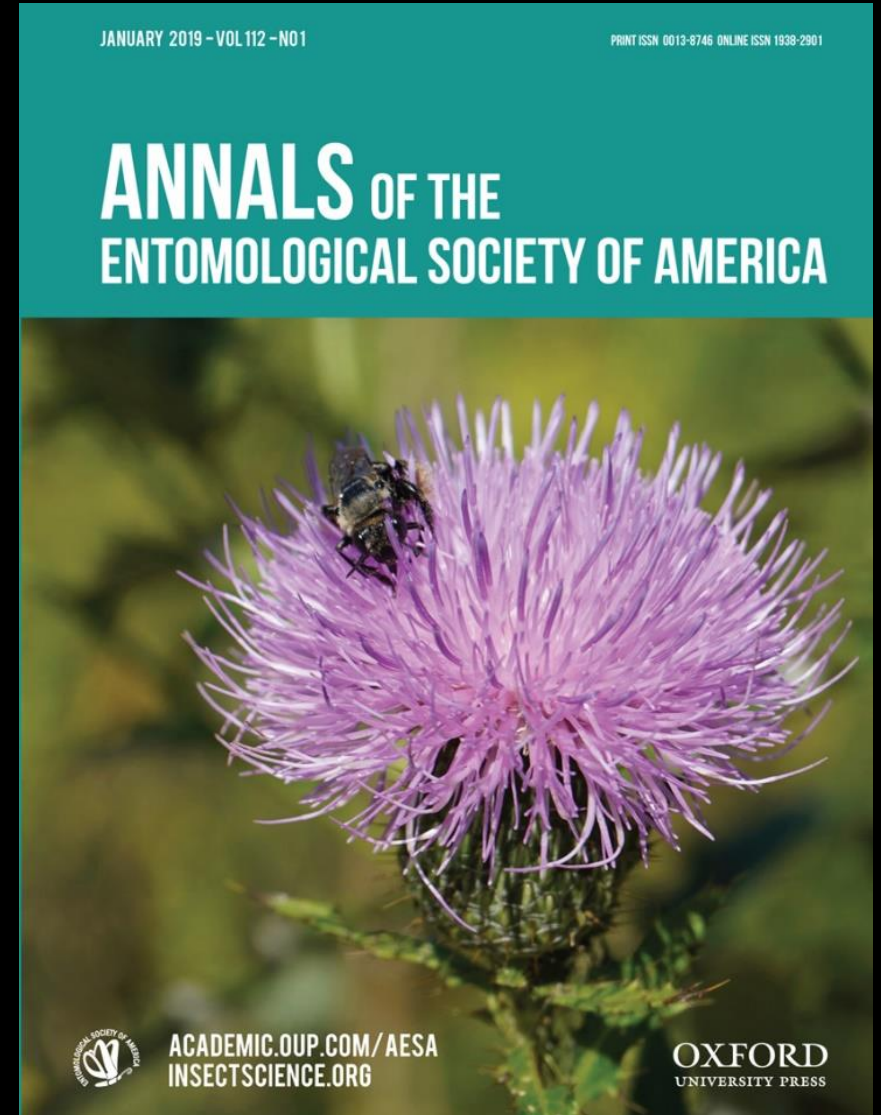




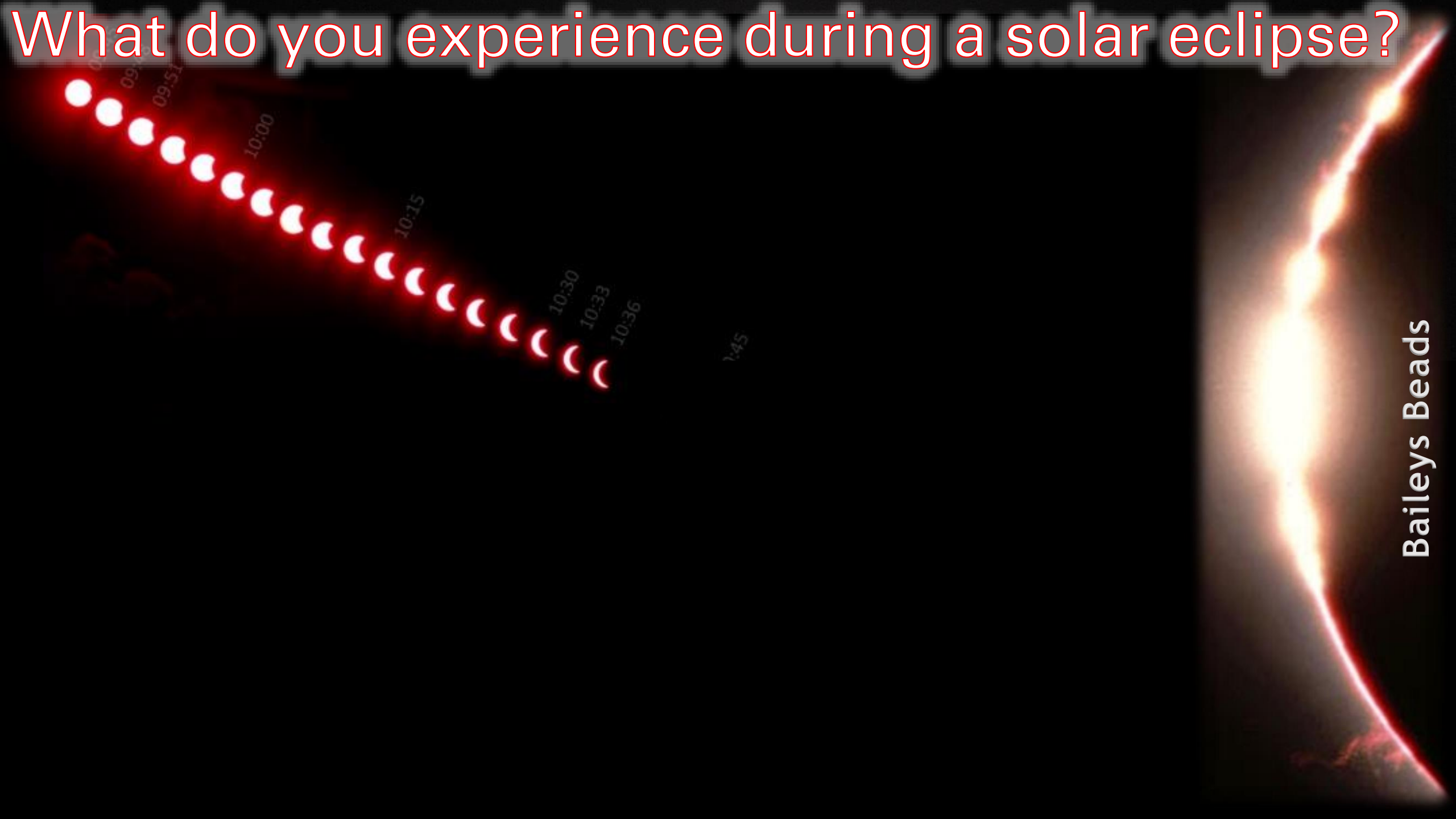


Rick Fienberg / TravelQuest International / Wilderness Travel

Life and the eclipse

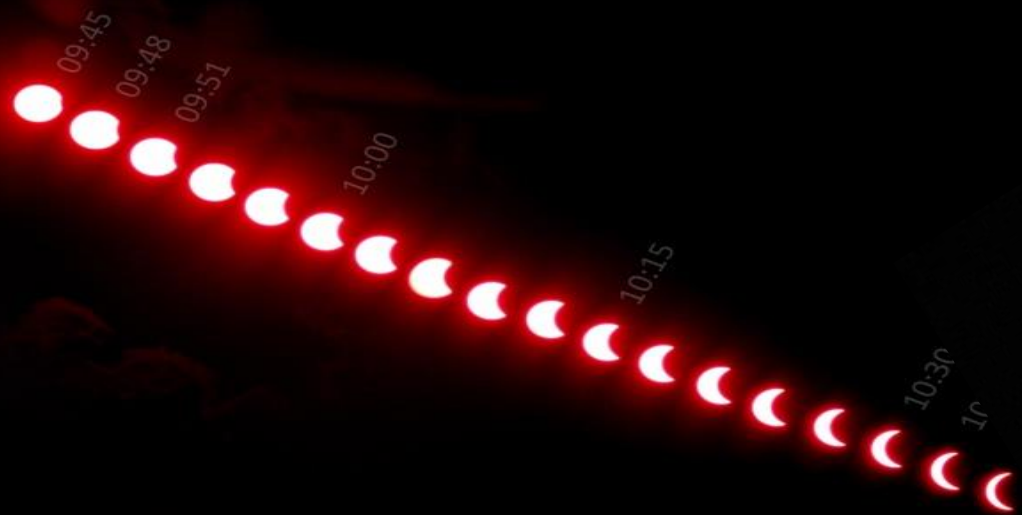


What do you experience during a solar eclipse?





What do you
experience during
a solar eclipse?



Diamond Ring

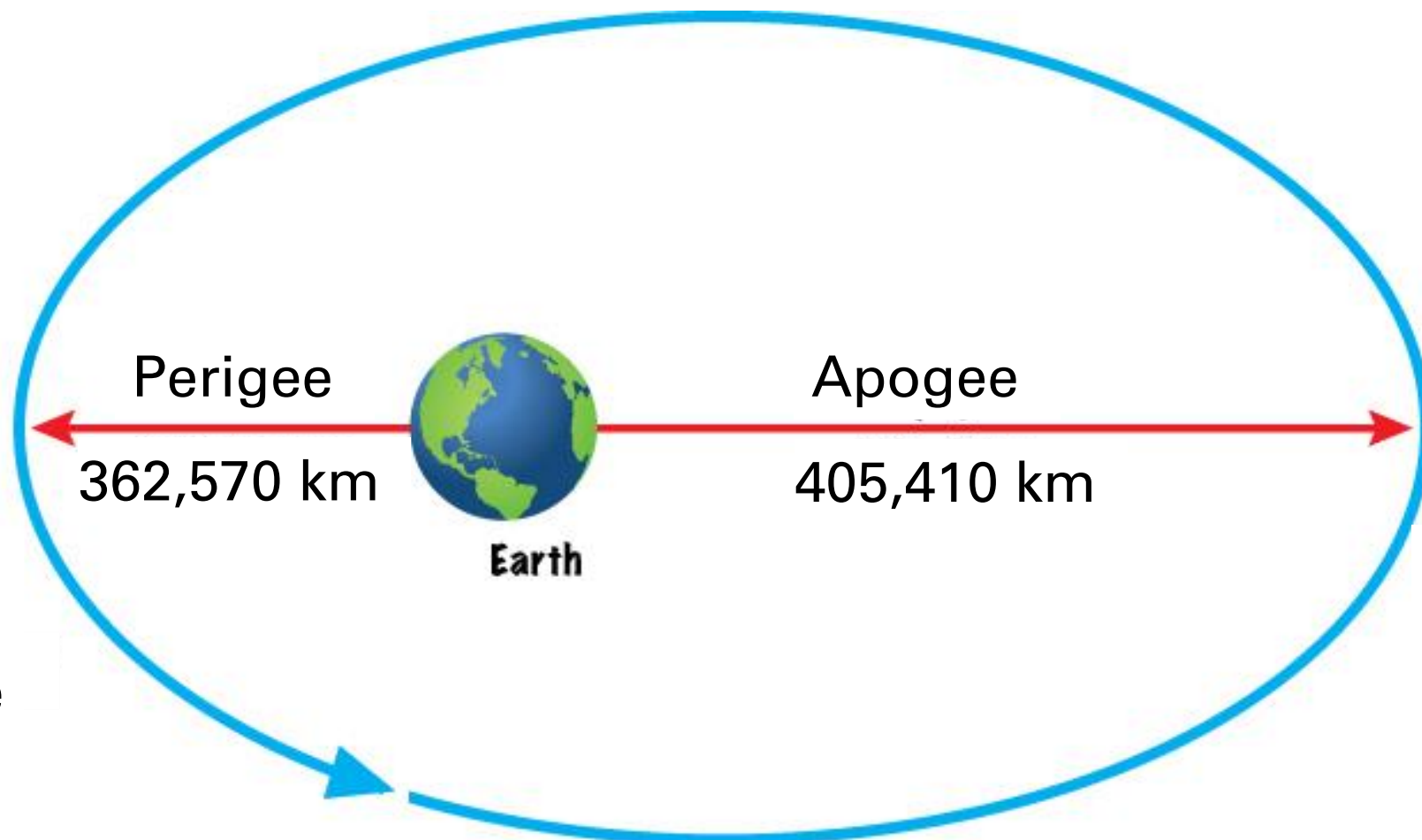
Total Solar Eclipse as seen from Madras, OR, August 21st 2017.



CREDIT: Rick Fienberg
(former AAS Press Officer)

Annular eclipses

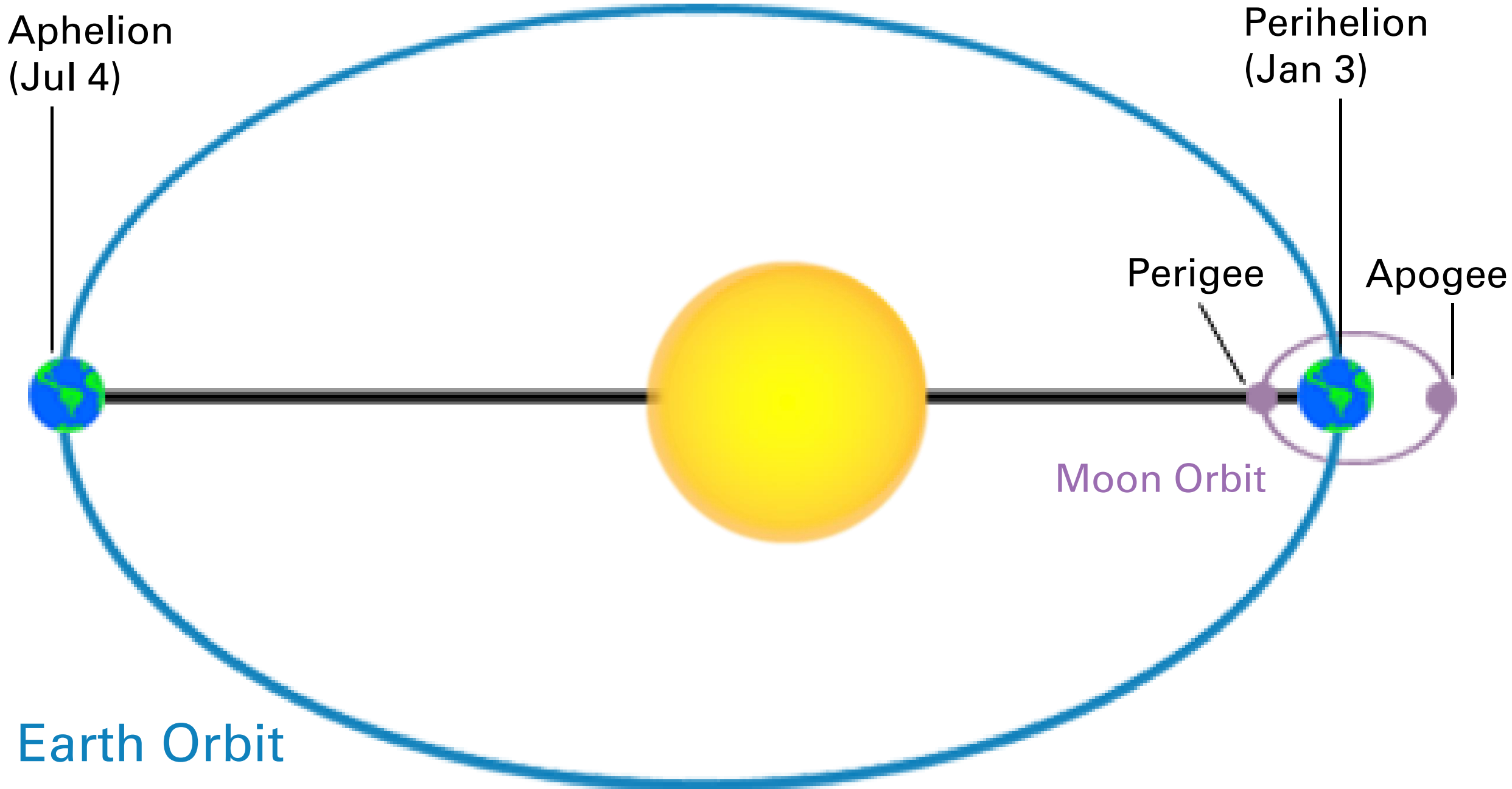




At perigee, the Moon is closer to the Earth and looks slightly larger

At apogee, the Moon is farther from the Earth and looks slightly smaller

Moon's Orbit is elliptical (greatly exaggerated here)

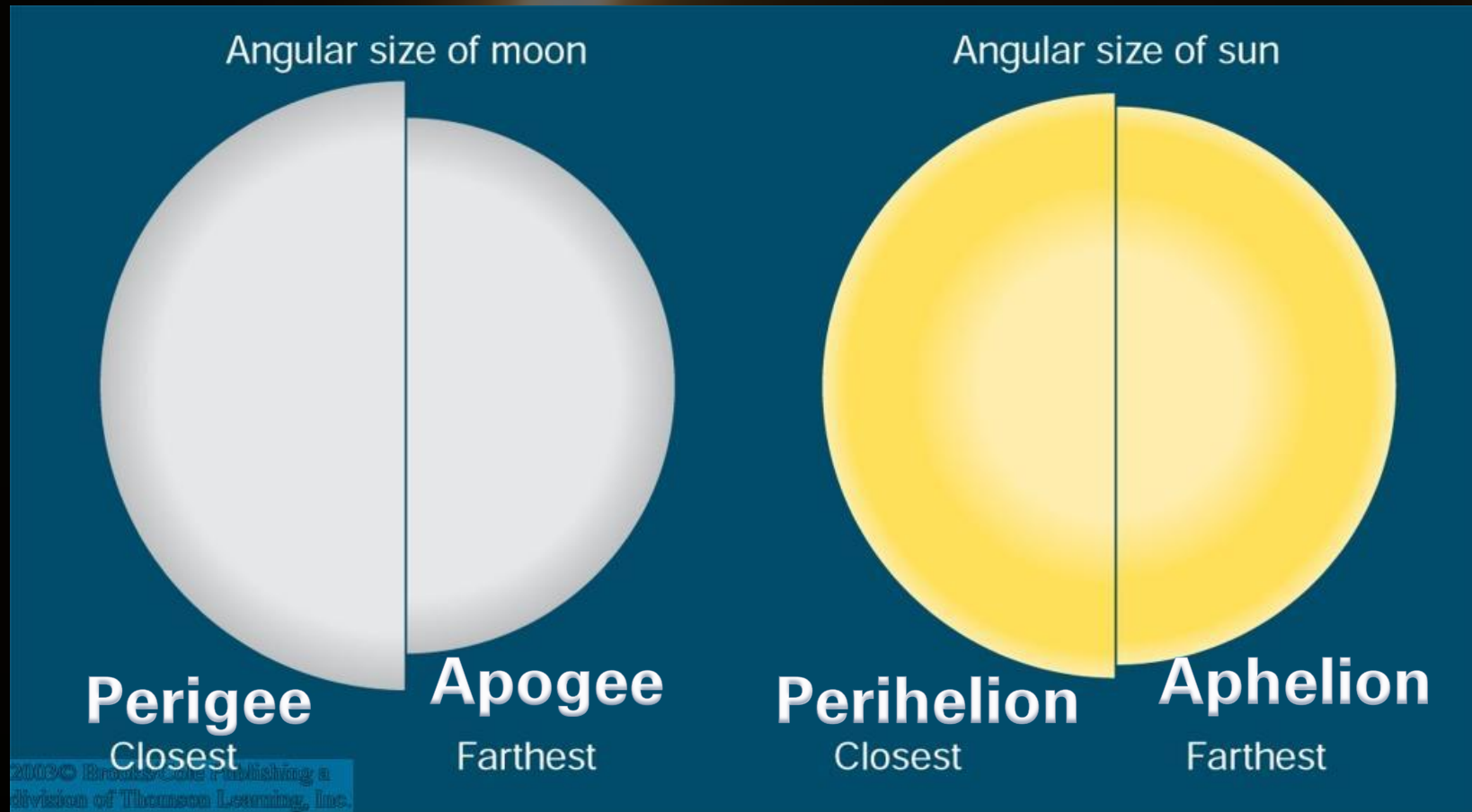


Annular Solar Eclipses

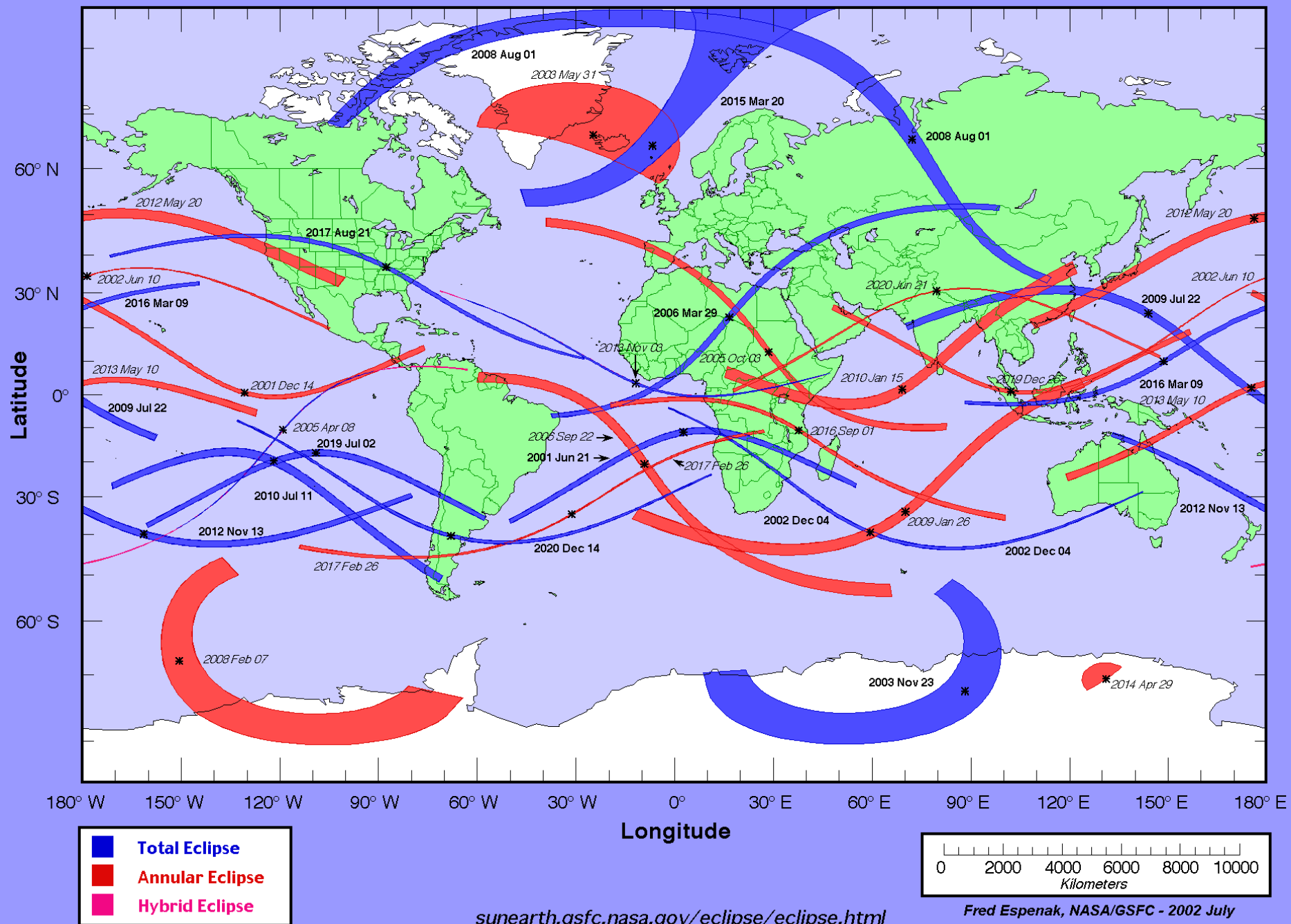
When Earth is near perihelion, and the moon is near apogee, we see an annular solar eclipse.



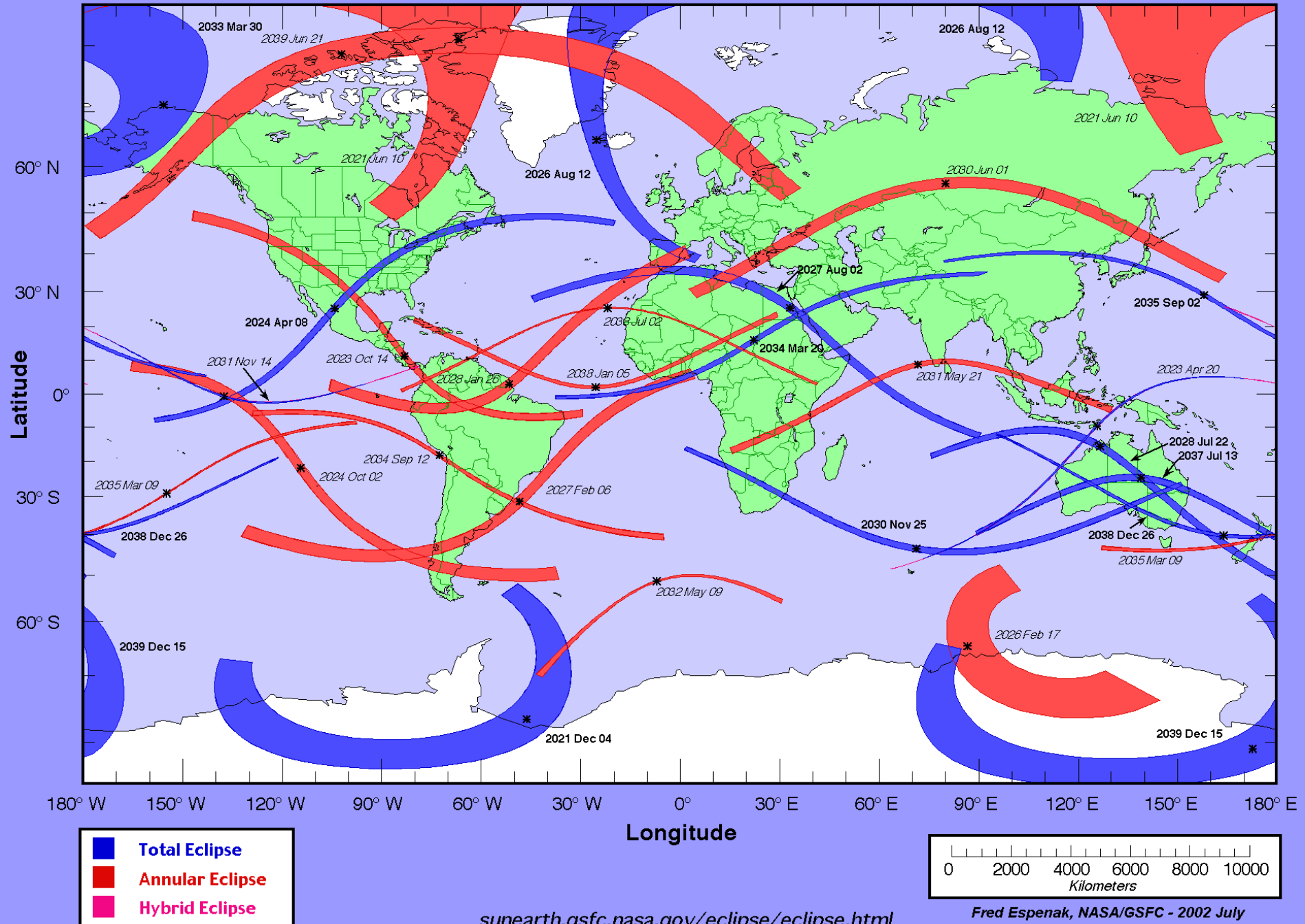
The angular sizes of the moon and the sun vary, depending on their distance from Earth.



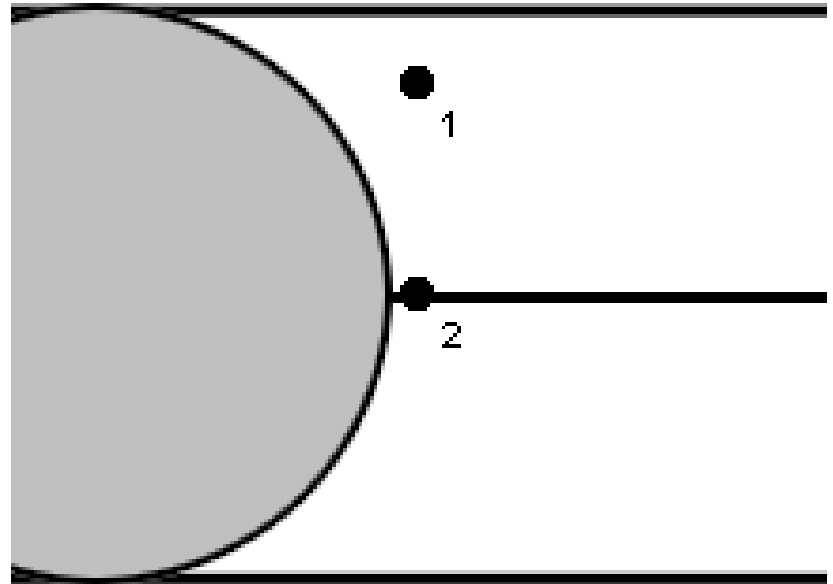
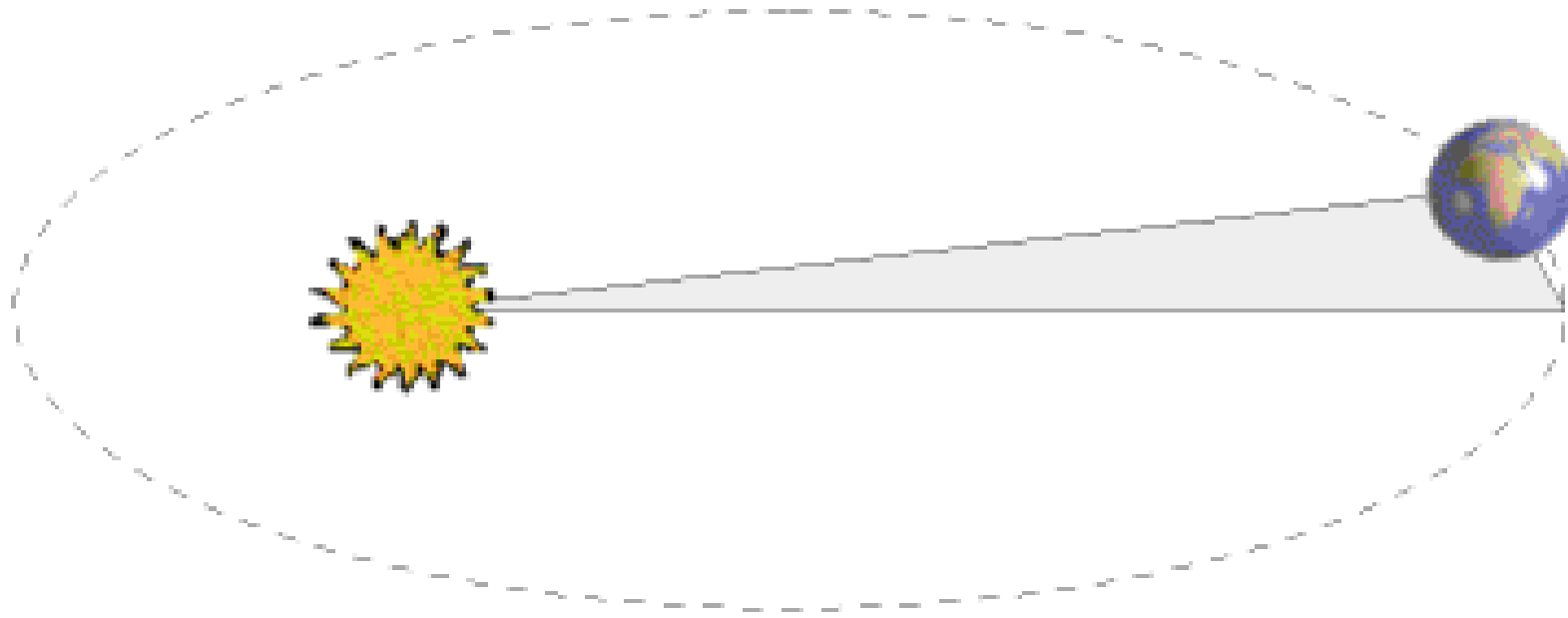
Total and Annular Solar Eclipse Paths: 2001 – 2020

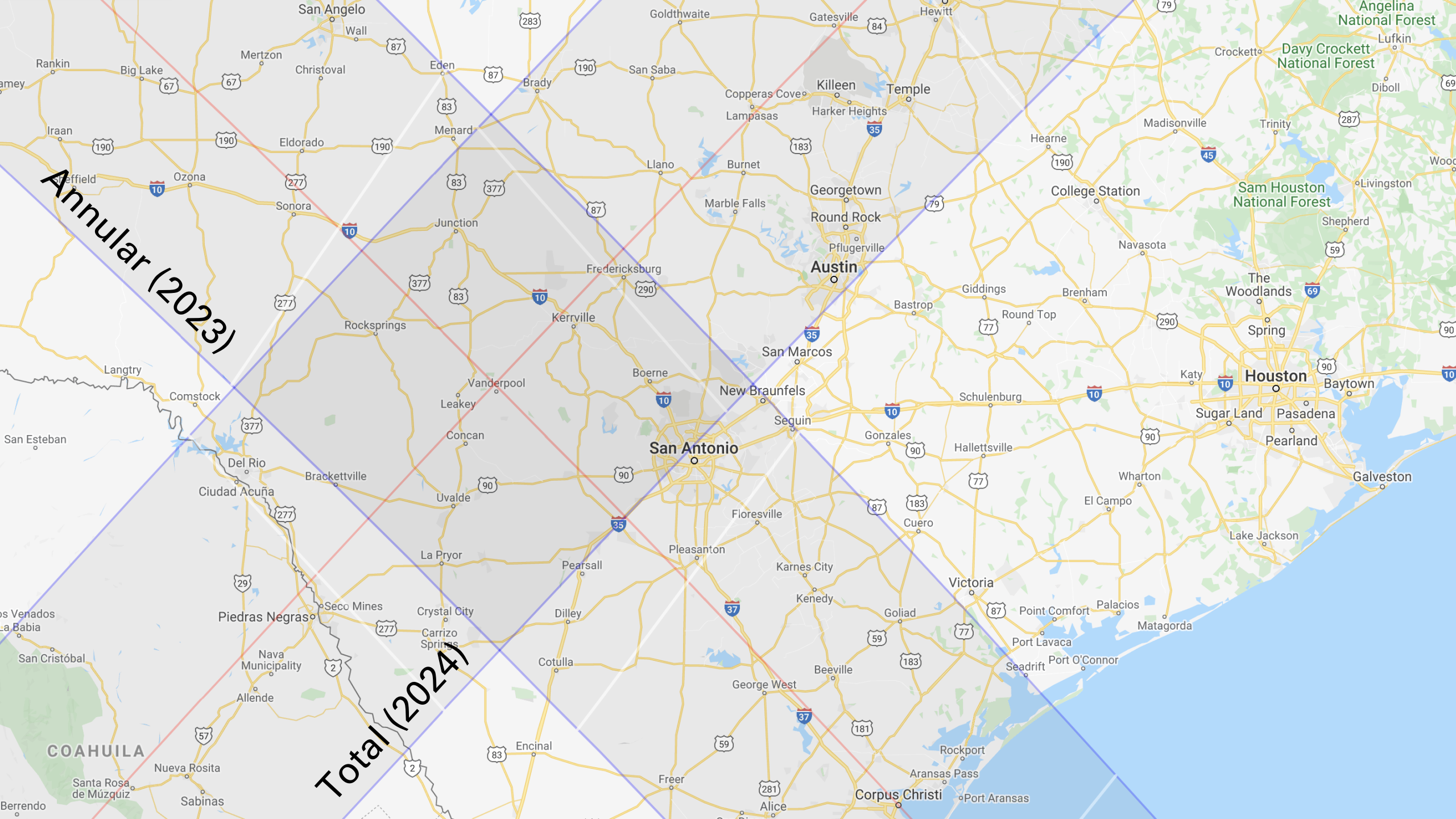


Total and Annular Solar Eclipse Paths: 2021 –2040



How long do eclipses last?





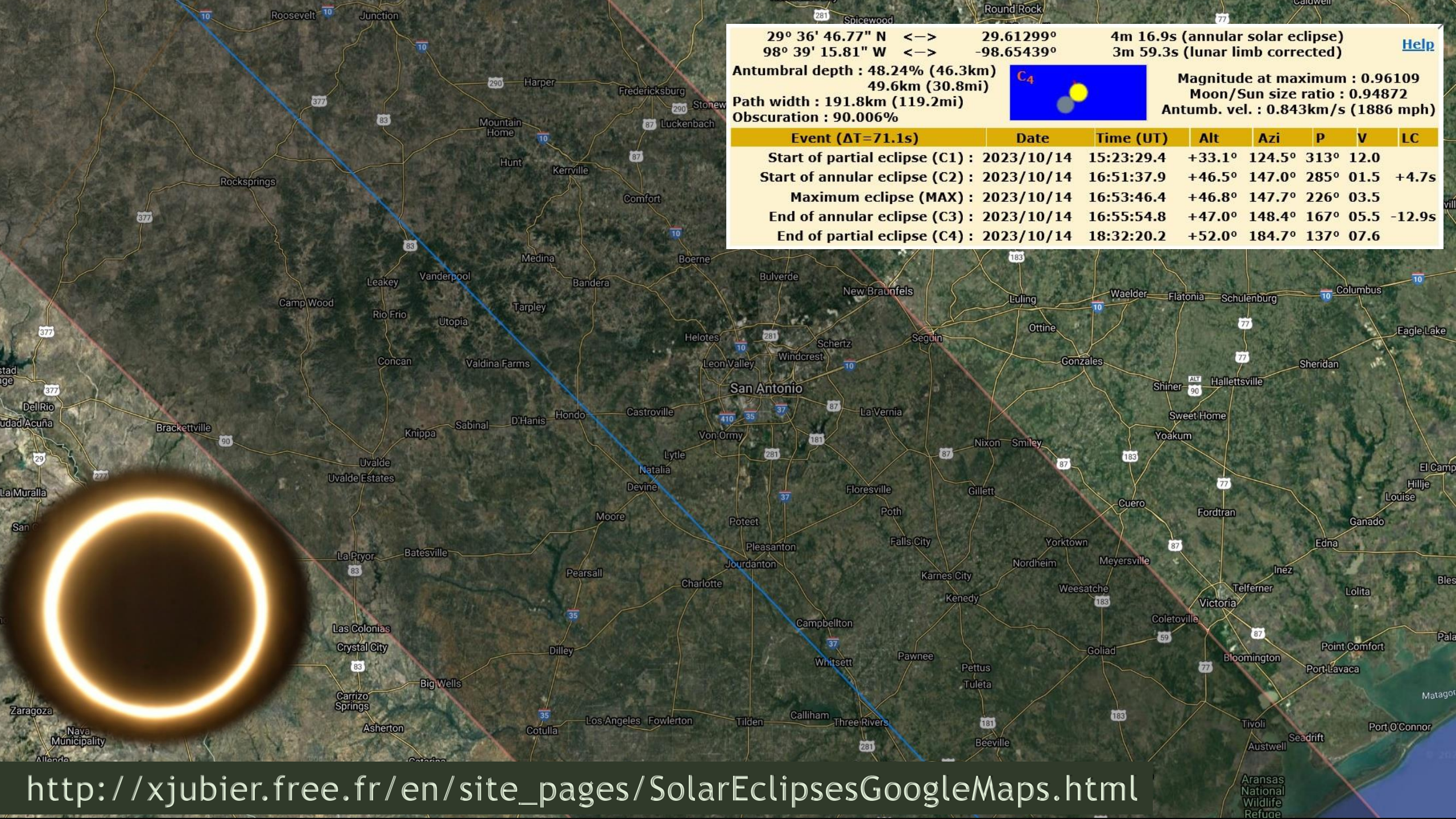
Annular (2023)

Total (2024)

October
14th 2023







29° 36' 46.77" N <--> 29.61299°

98° 39' 15.81" W <--> -98.65439°

4m 16.9s (annular solar eclipse)

3m 59.3s (lunar limb corrected)

Antumbral depth : 48.24% (46.3km)

49.6km (30.8mi)

Path width : 191.8km (119.2mi)

Obscuration : 90.006%

C₄

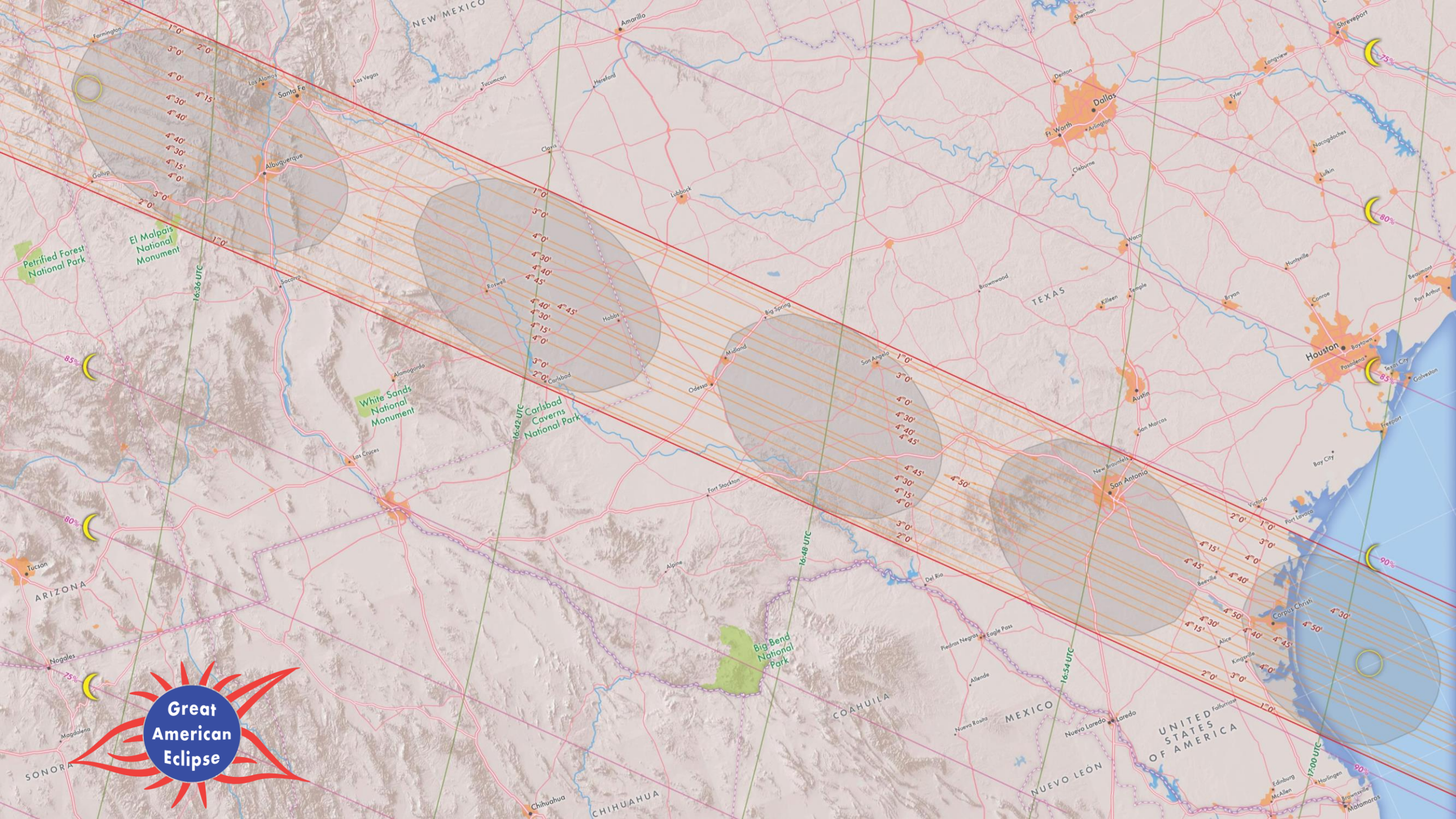
Magnitude at maximum : 0.96109

Moon/Sun size ratio : 0.94872

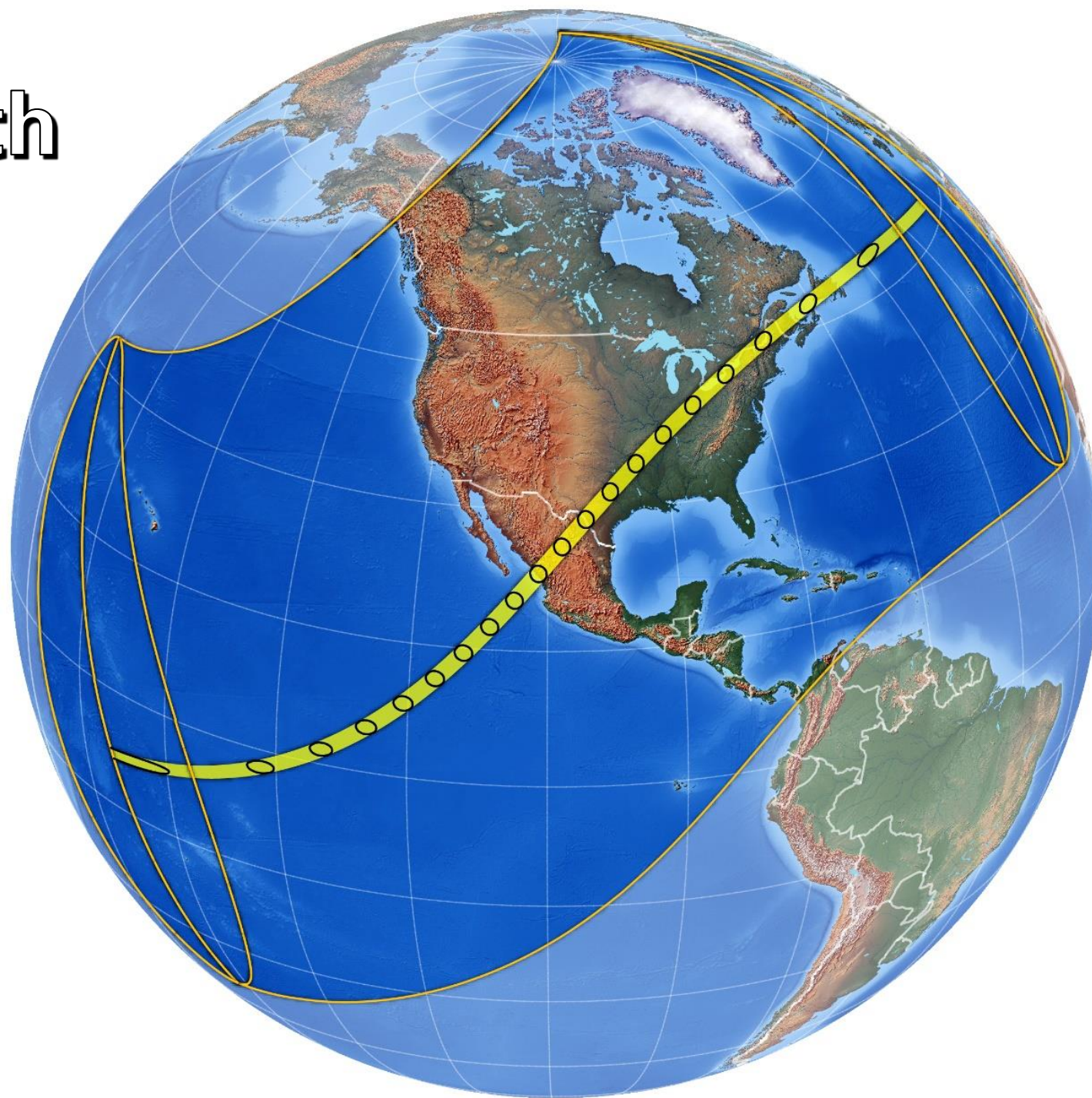
Antumb. vel. : 0.843km/s (1886 mph)

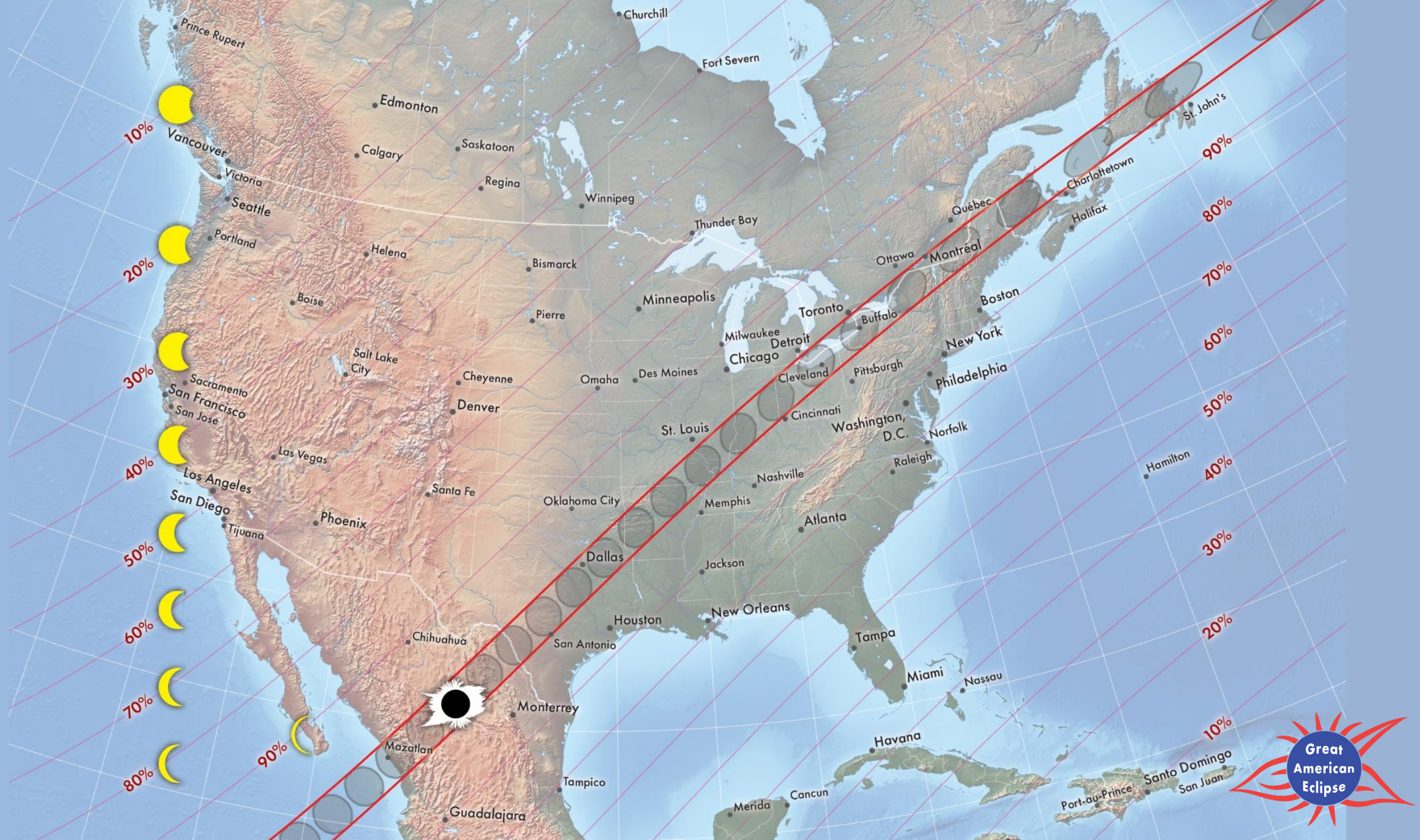
Event (ΔT=71.1s)	Date	Time (UT)	Alt	Azi	P	V	LC
Start of partial eclipse (C1) :	2023/10/14	15:23:29.4	+33.1°	124.5°	313°	12.0	
Start of annular eclipse (C2) :	2023/10/14	16:51:37.9	+46.5°	147.0°	285°	01.5	+4.7s
Maximum eclipse (MAX) :	2023/10/14	16:53:46.4	+46.8°	147.7°	226°	03.5	
End of annular eclipse (C3) :	2023/10/14	16:55:54.8	+47.0°	148.4°	167°	05.5	-12.9s
End of partial eclipse (C4) :	2023/10/14	18:32:20.2	+52.0°	184.7°	137°	07.6	

http://xjubier.free.fr/en/site_pages/SolarEclipsesGoogleMaps.html



April 8th
2024





29° 36' 46.77" N <—> 29.61299° 2m 43.4s (total solar eclipse)
98° 39' 15.81" W <—> -98.65439° 2m 46.2s (lunar limb corrected)

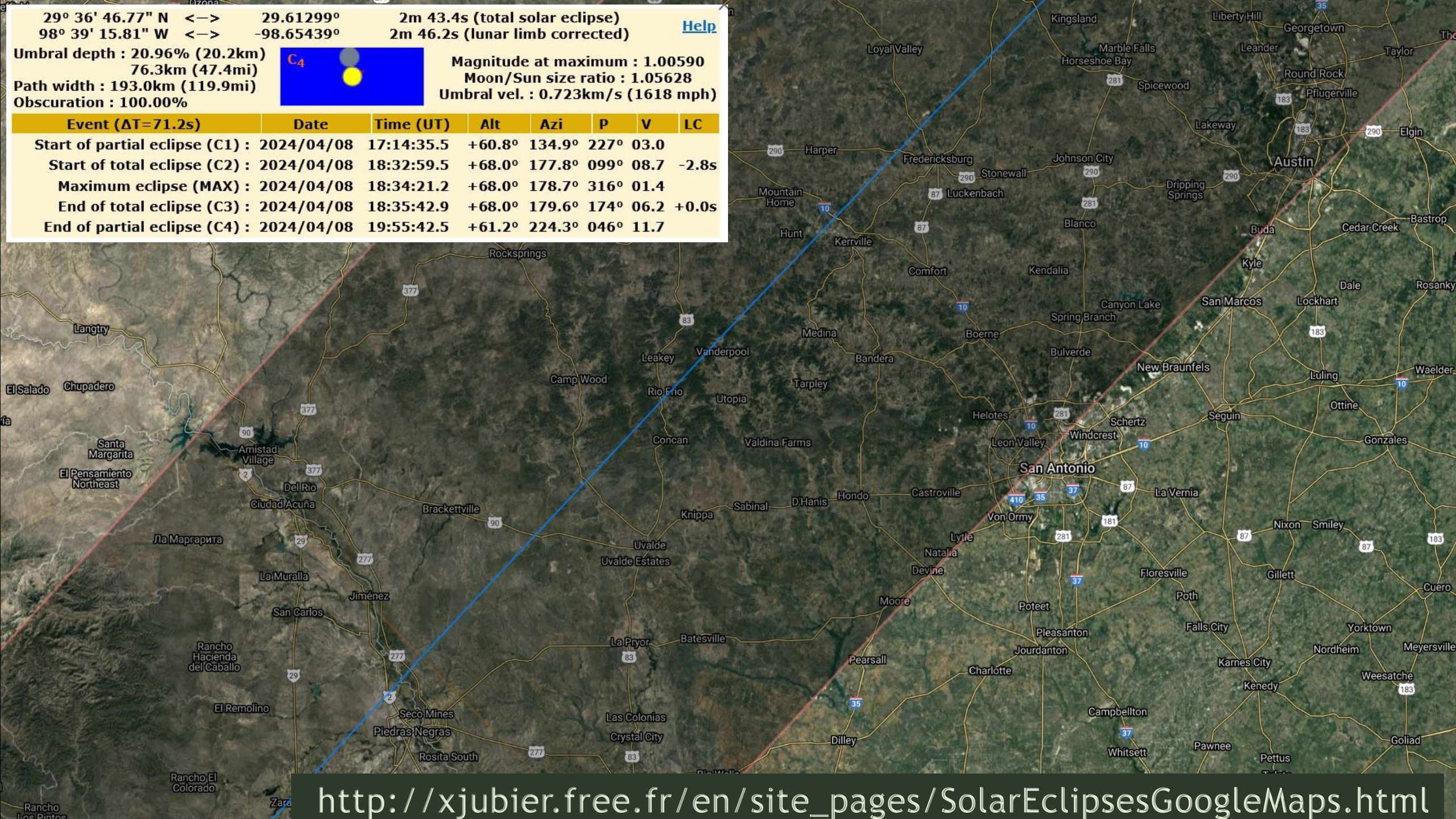
[Help](#)

Umbral depth : 20.96% (20.2km)
76.3km (47.4mi)
Path width : 193.0km (119.9mi)
Obscuration : 100.00%

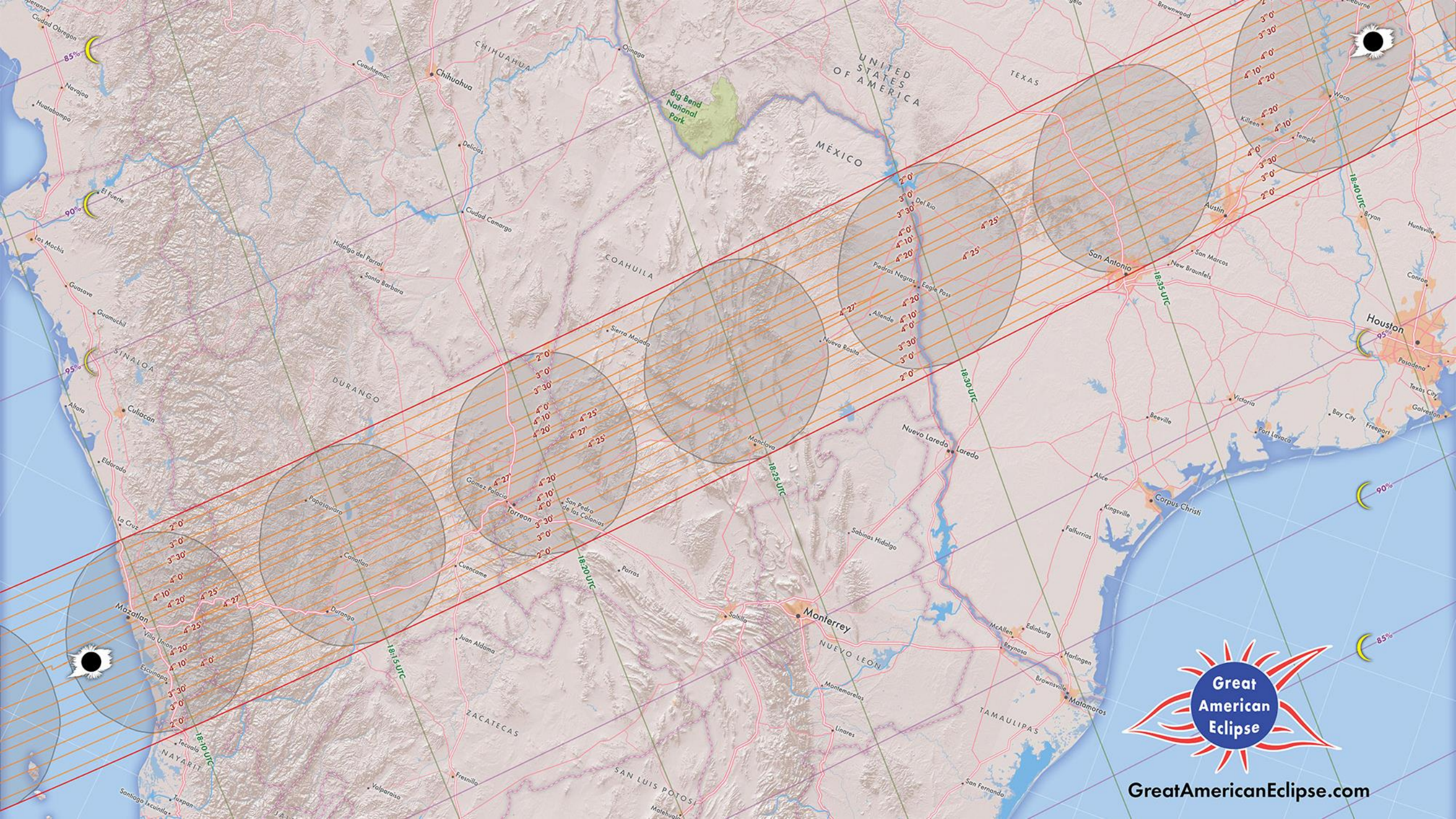


Magnitude at maximum : 1.00590
Moon/Sun size ratio : 1.05628
Umbral vel. : 0.723km/s (1618 mph)

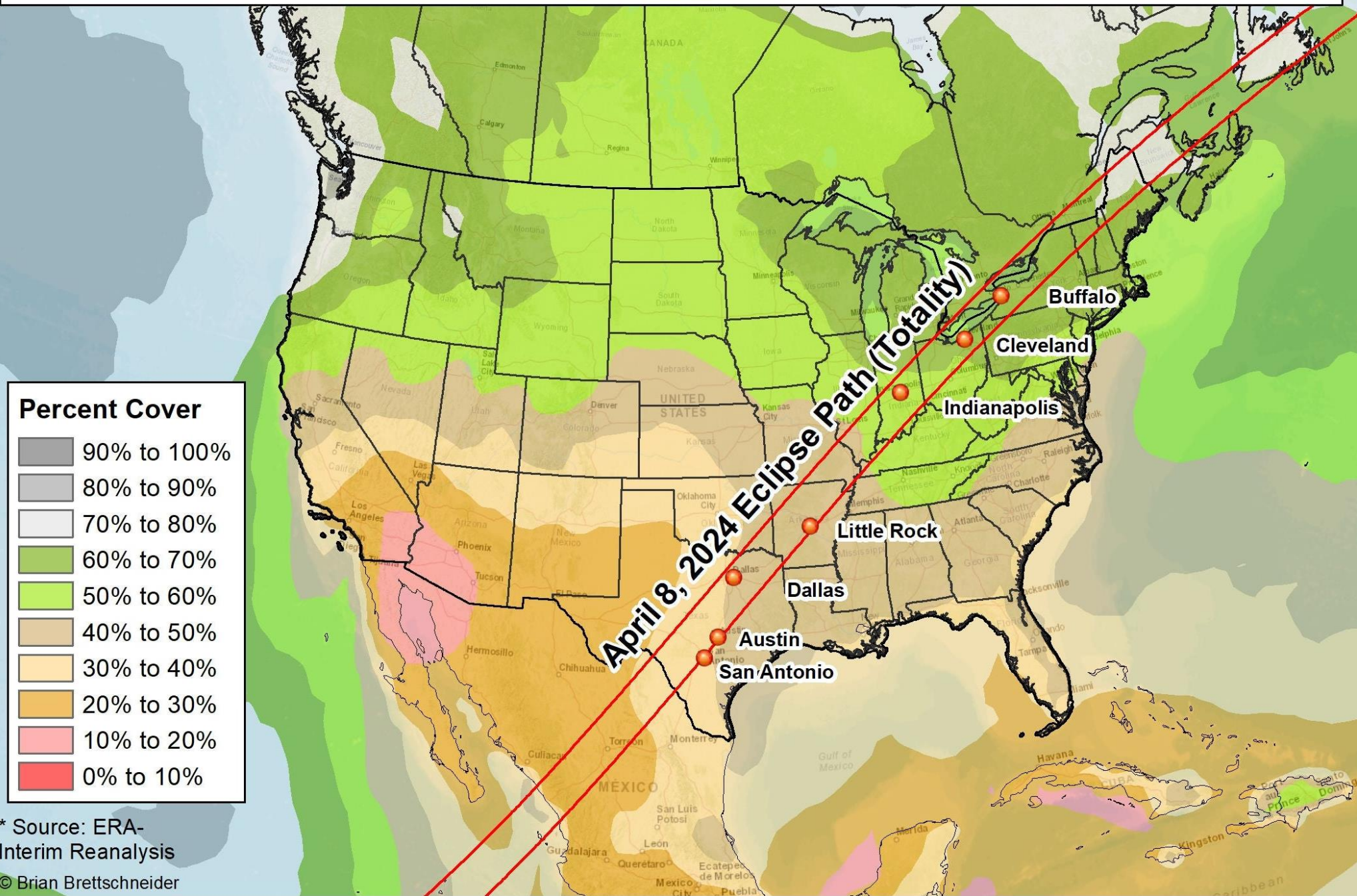
Event ($\Delta T=71.2s$)	Date	Time (UT)	Alt	Azi	P	V	LC
Start of partial eclipse (C1) :	2024/04/08	17:14:35.5	+60.8°	134.9°	227°	03.0	
Start of total eclipse (C2) :	2024/04/08	18:32:59.5	+68.0°	177.8°	099°	08.7	-2.8s
Maximum eclipse (MAX) :	2024/04/08	18:34:21.2	+68.0°	178.7°	316°	01.4	
End of total eclipse (C3) :	2024/04/08	18:35:42.9	+68.0°	179.6°	174°	06.2	+0.0s
End of partial eclipse (C4) :	2024/04/08	19:55:42.5	+61.2°	224.3°	046°	11.7	



http://xjubier.free.fr/en/site_pages/SolarEclipsesGoogleMaps.html



Cloud Coverage Climatology at 18 UTC Between April 3 and Apr 13 (1979-2016)*



* Source: ERA-Interim Reanalysis

© Brian Brettschneider



Annular Eclipse: 554 days

Total Eclipse: 731 days (2 years!)

AMERICAN SOLAR ECLIPSES

- TOTAL SOLAR ECLIPSE OF 2017 AUGUST 21
- ANNULAR SOLAR ECLIPSE OF 2021 JUNE 10
- ANNULAR SOLAR ECLIPSE OF 2023 OCTOBER 14
- TOTAL SOLAR ECLIPSE OF 2024 APRIL 8





SILLY ME, HANK!
I GOT IT BACKWARDS...
IT'S **CARDBOARD** FOR
A **SOLAR** ECLIPSE AND
BINOCULARS FOR A
LUNAR ECLIPSE!

SOLAR
ECLIPSE
TODAY

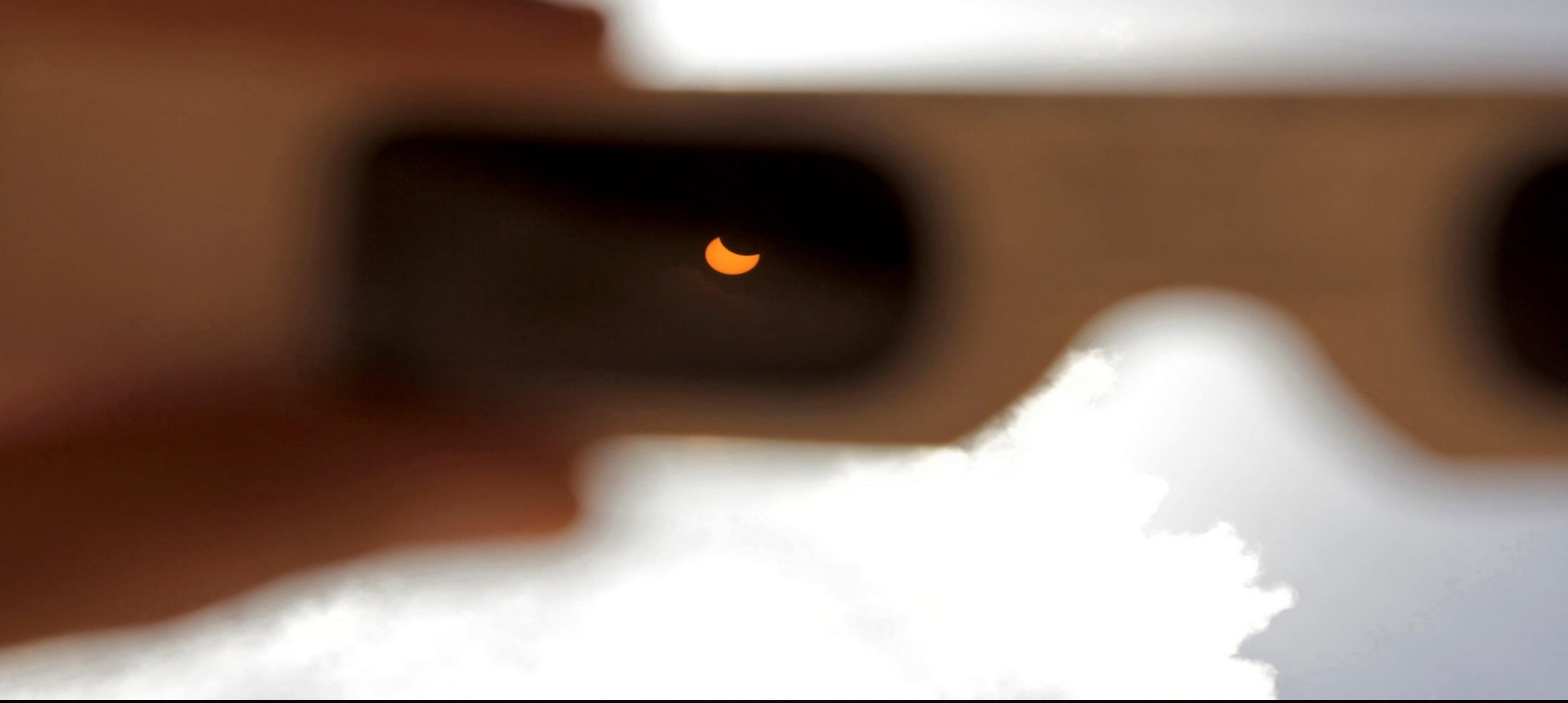
5/20/12

Bryan

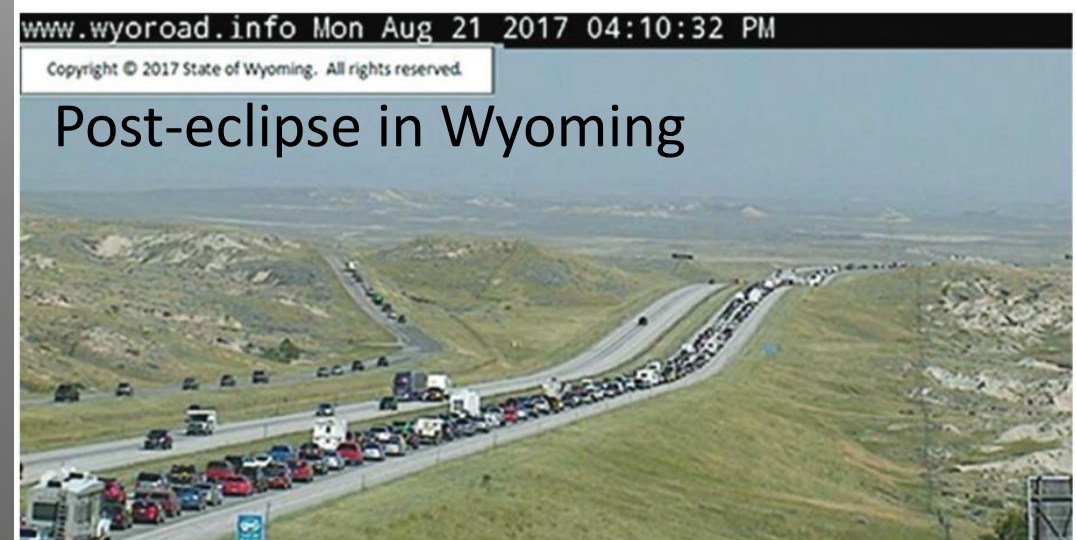
WWW.CARTOONADAY.COM

"RING OF FIRE" SOLAR ECLIPSE

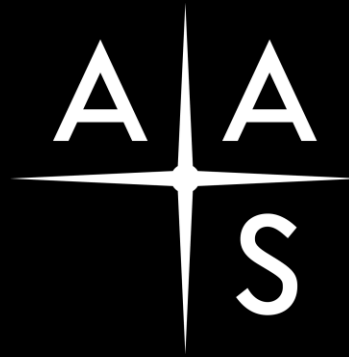
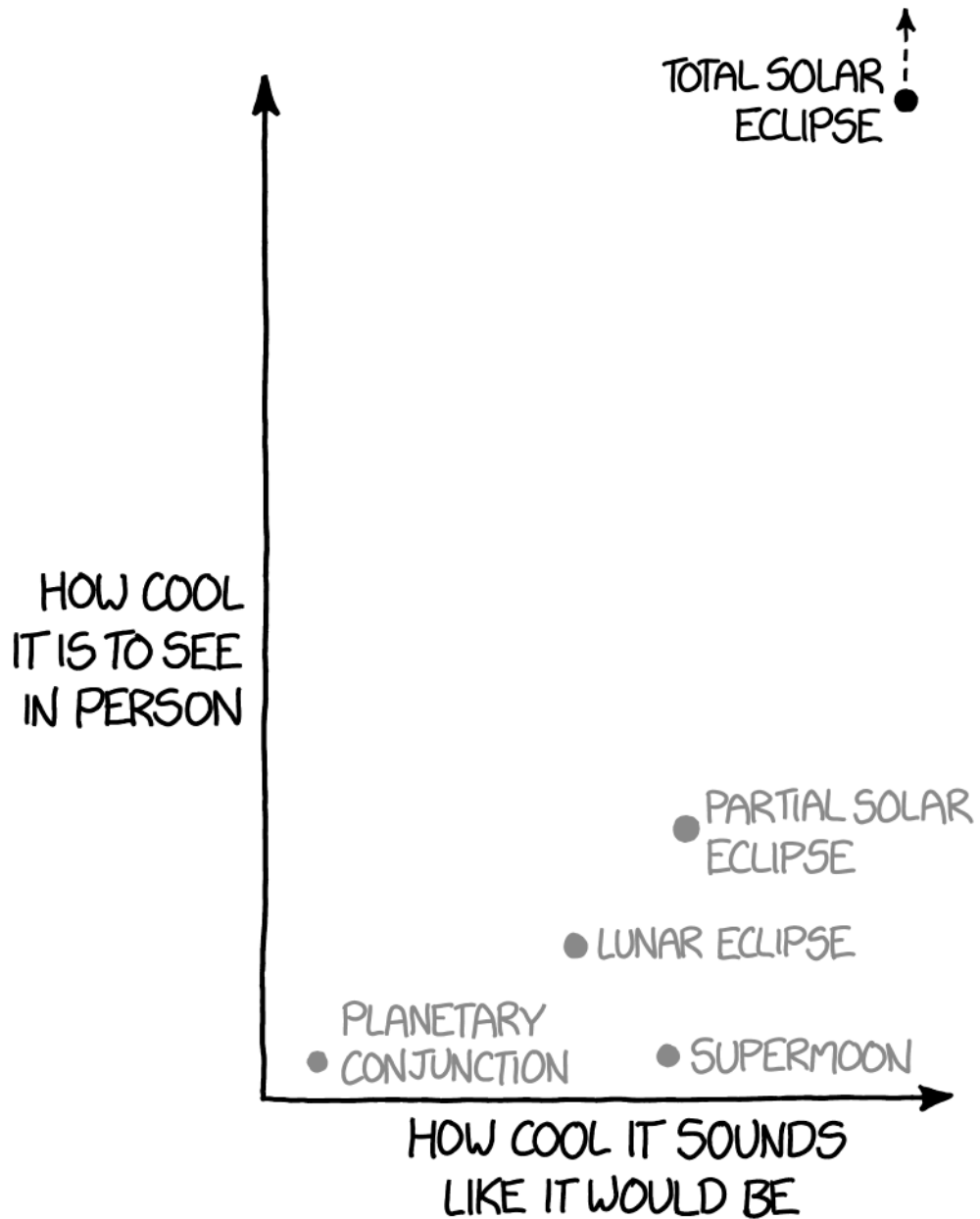








Pre-eclipse at the Tetons



AMERICAN
ASTRONOMICAL
SOCIETY

<https://eclipse.aas.org/>



