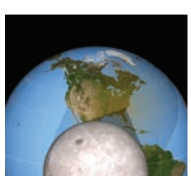
National Aeronautics and
Space Administration

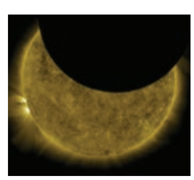
NASA Hyperwall Science Stories

Table of Contents

2017 Total Solar Eclipse

On Monday, August 21, 2017, all of North America will be treated to an eclipse of the sun. Anyone within the path of totality can see one of nature's most awe inspiring sights—a *total solar eclipse*. This path, where the moon will completely cover the sun and the sun's tenuous atmosphere—the *corona*—can be seen, will stretch from Salem, Oregon to Charleston, South Carolina. Observers outside this path will still see a partial solar eclipse where the moon covers part of the sun's disk.




Hyperwall Stories are Available for Download at:
svs.gsfc.nasa.gov/hw

2017 Total Solar Eclipse

2017 Total Solar Eclipse Map

This map of the United States shows the path of the moon's *umbral shadow*—the path of totality—during the total solar eclipse on August 21, 2017, as well as the obscuration (the fraction of the sun's area covered by the moon) in places outside the umbral path. Features include state boundaries, major highways, and 833 place names.

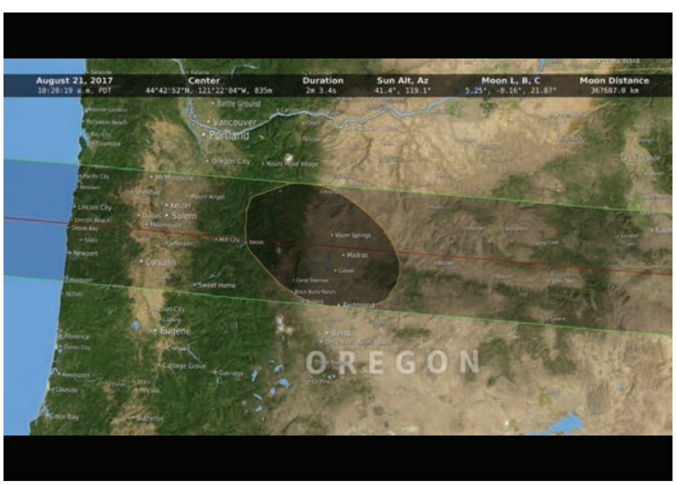
https://svs.gsfc.nasa.gov/4518

2017 Total Solar Eclipse in the U.S.

On Monday, August 21, 2017, the moon will pass in front of the sun, casting its shadow across all of North America. This will be the first total solar eclipse visible in the contiguous United States in 38 years.

The moon's shadow can be divided into areas called the *umbra* and the *penumbra*. Within the penumbra, the sun is only partially blocked, and observers experience a partial eclipse. The much smaller umbra lies at the very center of the shadow cone, and anyone there sees the moon entirely cover the sun in a total solar eclipse. In the animation, the umbra is the small black oval. The red streak behind this oval is the path of totality. Anyone within this path will see a total eclipse when the umbra passes over them. The much larger shaded bullseye pattern represents the penumbra. Steps in the shading denote different percentages of sun coverage (eclipse magnitude), at levels of 90%, 75%, 50%, and 25%. The yellow and orange contours map the path of the penumbra.

https://svs.gsfc.nasa.gov/4314



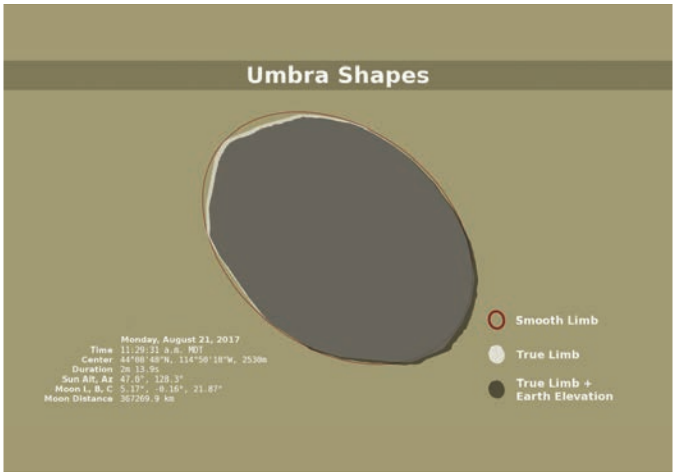
2017 Path of Totality

During the August 21, 2017 total solar eclipse, the moon's umbral shadow will "fly" across the United States, from Oregon to South Carolina, in a little over 90 minutes. The path of this shadow, the *path of totality*, is where observers will see the moon completely cover the sun for about two and a half minutes.

This animation shows the umbra and its path in a new way. Elevations on the Earth's surface and the irregular *lunar limb* (the silhouette edge of the moon's disk) are both fully accounted for, and they both have dramatic and surprising effects on the shape of the umbra and the location of the path. The animation provides an overhead view of the umbra and runs at a rate of 30× real time—every minute of the eclipse takes two seconds in the animation.

https://svs.gsfc.nasa.gov/4515

2017 Total Solar Eclipse

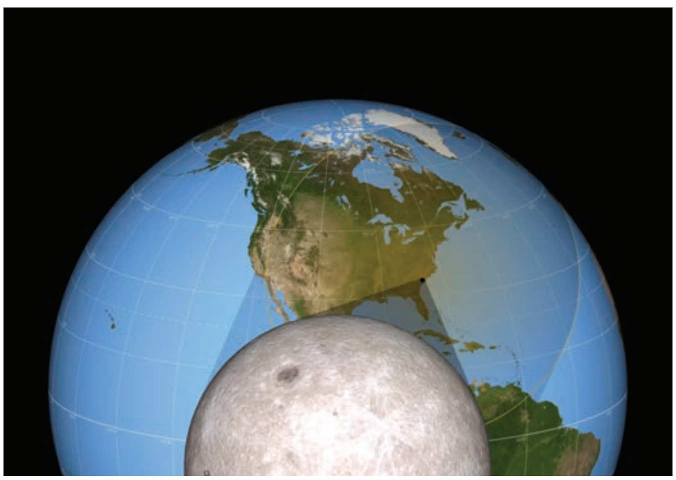


Umbra Shapes

For centuries, eclipse maps have depicted the shape of the moon's umbra on the ground as a smooth ellipse. But as this visualization shows—in a way never seen before—the shape is dramatically altered by both the rugged lunar terrain and the elevations of observers on the Earth.

The true shape of the umbra is more like an irregular polygon with slightly curved edges. Each edge corresponds to a single valley on the lunar limb, the last (or first) spot on the limb that lets sunlight through. This is the location of the diamond part of the diamond ring effect visible in the seconds just before or just after totality. An observer standing at the cusp where two edges meet will be treated to a double diamond ring. As these edges pass over mountain ranges (for the 2017 eclipse, this includes the Cascades, Rockies, and Appalachians), they are scalloped by the peaks and valleys of the landscape. The higher elevations in the western states in 2017 also shift the umbra toward the southeast (in the direction of the sun's azimuth) by as much as 3 kilometers.

https://svs.gsfc.nasa.gov/4517



2017 Eclipse Shadow Cones

A solar eclipse occurs when the moon's shadow falls on the Earth. The shadow comprises two concentric cones called the *umbra* and the *penumbra*. Within the smaller, central umbra, the sun is completely blocked by the moon, and anyone inside the umbra sees a total eclipse. Within the larger penumbra, the sun is only partially blocked.

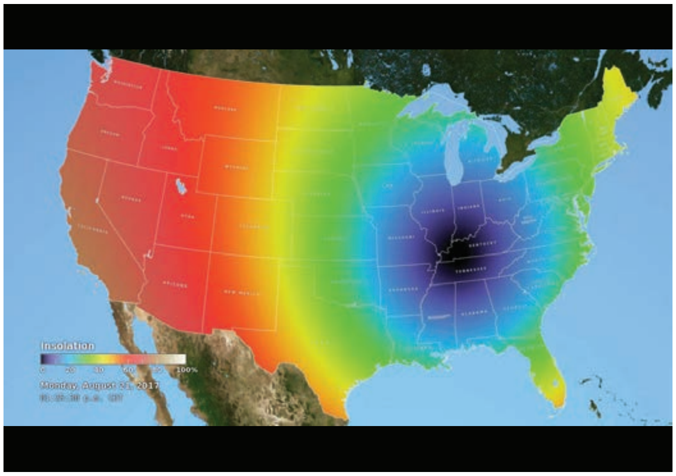
In this animation, the umbra and penumbra cones are viewed through a telescopic lens on a virtual camera located far behind the moon. Long focal lengths like the one used here appear to compress the distance between near and far objects. Despite appearances, the geometry of the scene is correct. The Earth is roughly 112 lunar diameters beyond the moon, and the angle at the apex of the umbral cone is only about half a degree.

https://svs.gsfc.nasa.gov/4321

2017 Eclipse—State Maps

The path of totality passes through 14 states during the total solar eclipse on August 21, 2017. A map of each of these states, created for NASA's official eclipse 2017 website, is presented here. Except for Montana, each map is 8 inches wide (or high) at 300 DPI. The umbra is shown at 3-minute intervals, with times in the local time zone at the umbra center. The duration of totality is outlined in 30-second increments. Interstate highways are blue, other major roads are red, and secondary roads are gray.

https://svs.gsfc.nasa.gov/4552

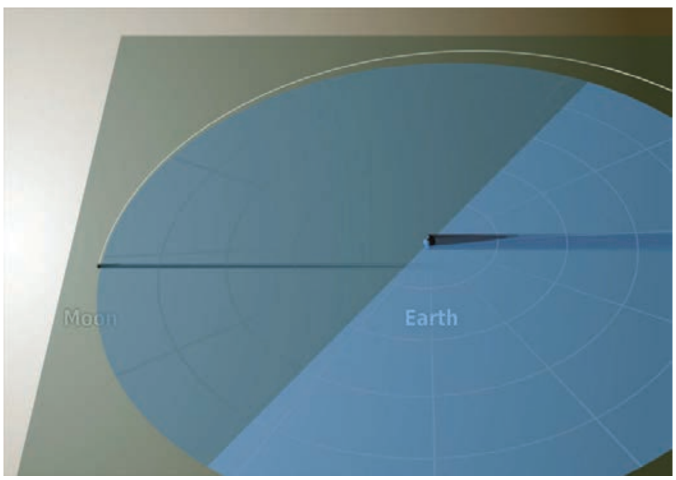


Insolation During the 2017 Eclipse

On an ordinary day, the *insolation*—the amount of sunlight hitting a given spot on the Earth—is proportional to the sine of the sun's altitude. When the sun is 30° above the horizon, the sunlight energy per square meter is half of what it is when the sun is directly overhead. This relationship is the reason that the tropics are hot and the poles are cold. Combined with day length, it's also the reason for the difference in temperature between the seasons at temperate latitudes.

As this animation shows, the moon's shadow dramatically, if temporarily, affects insolation in the continental United States during the total solar eclipse of August 21, 2017. The effect is readily apparent to observers in the path of totality. As the umbra passes overhead, the temperature drops by several degrees. The cooled column of air within the shadow cone can even influence cloud formation and the speed and direction of the wind.

https://svs.gsfc.nasa.gov/4466

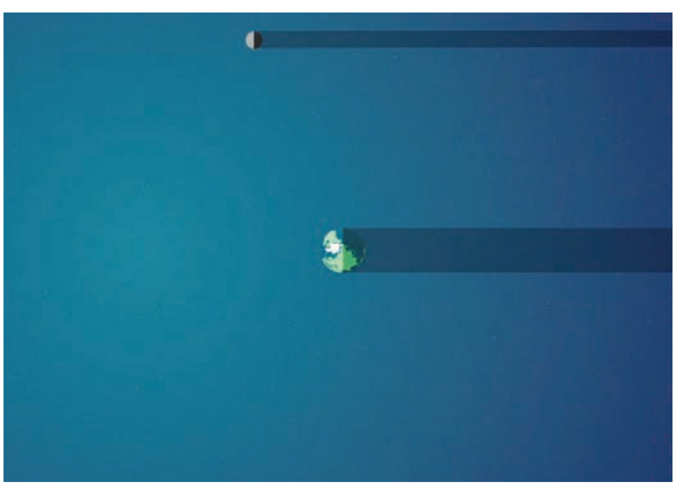


2017 Eclipse and the Moon's Orbit

Solar eclipses can only occur at new moon, when the moon is between the Earth and the sun. But not every new moon produces an eclipse. The moon's orbit is slightly tilted, and as seen in this animation, the tilt causes the moon's shadow to miss the Earth during most new moons—about five out of six, in fact.

As the Earth-moon system orbits the sun throughout the year, the moon's orbital tilt changes direction relative to the sun. Twice a year, for about a month, what's facing the sun is the line dividing the up and down sides. This is the *line of nodes*, the intersection of the Earth-moon plane and the ecliptic or Earth-sun plane. A solar eclipse can only occur at a new moon that falls within one of these month-long eclipse seasons. That's when the moon is close enough to the ecliptic to actually come between the Earth and the sun. In this animation, the olive-colored square represents the ecliptic plane, while the light blue circle shows the plane of the moon's orbit. The darker half of the lunar orbit plane is below (south of) the ecliptic, and the dividing line between light and dark is the line of nodes.

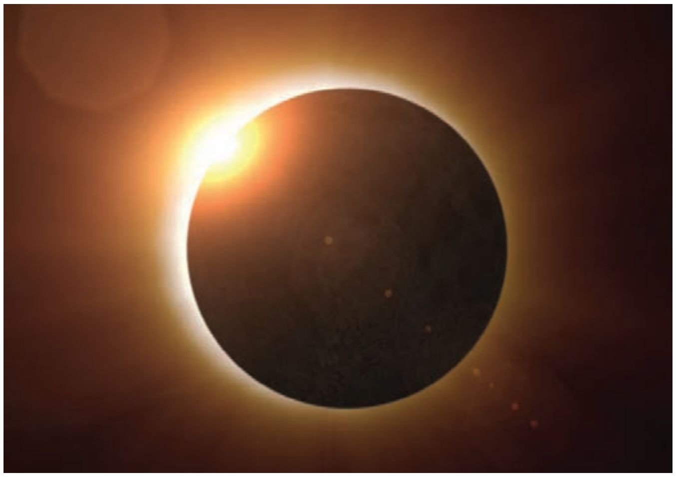
https://svs.gsfc.nasa.gov/4324



What Determines When We Have An Eclipse?

Why are eclipses rare? The moon's orbit is tilted. Sometimes the moon's shadow is too high above the Earth. Sometimes it is too low. Other times, it is just right.

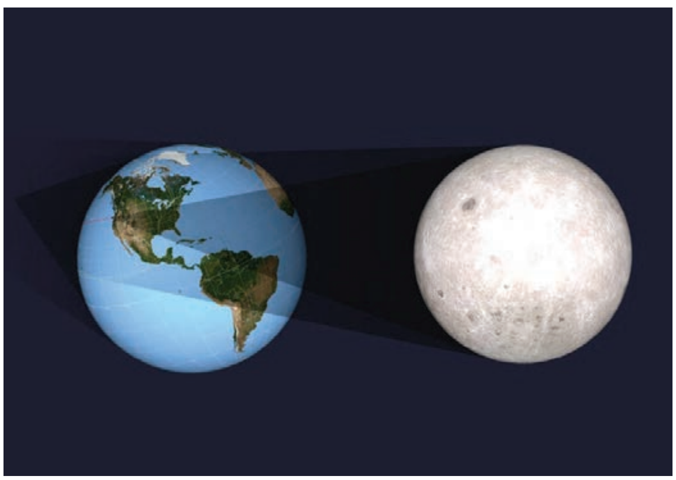
https://svs.gsfc.nasa.gov/12534



Solar Eclipse Animation

This animation of a total solar eclipse shows the moon passing between the Earth and the sun. On Monday, August 21, 2017, all of North America will be treated to an eclipse of the sun. Anyone within the path of totality can see one of nature's most awe inspiring sights—a total solar eclipse.

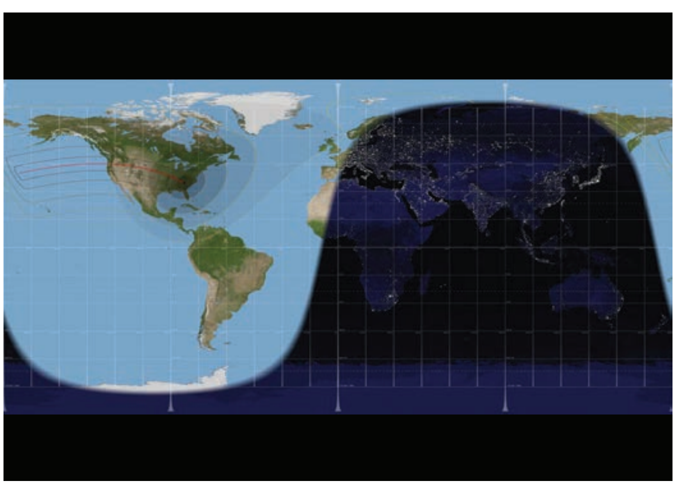
https://svs.gsfc.nasa.gov/20233



Flying Around the 2017 Eclipse Shadow

This visualization combines the views from several previous animations to create a continuous camera flight from the night side of the Earth to the day side, showing the relationship of the Earth, moon, and sun during the August 21, 2017 eclipse. It shows the direction of the moon's motion and the Earth's rotation, the complete path of the umbra from the moment it touches down on the Earth until the moment it departs and then pans out to show the true scale of the Earth-moon system.

https://svs.gsfc.nasa.gov/4579



August 21, 2017 Total Solar Eclipse Path for Spherical Displays

On Monday, August 21, 2017, the moon will pass in front of the sun, casting its shadow across all of North America. This will be the first total solar eclipse visible in the contiguous United States in 38 years.

The moon's shadow can be divided into areas called the *umbra* and the *penumbra*. Within the penumbra, the sun is only partially blocked, and observers experience a partial eclipse. The much smaller umbra lies at the very center of the shadow cone, and anyone there sees the moon entirely cover the sun in a total solar eclipse.

In the animation, the umbra is the small black oval. The red streak behind this oval is the *path of totality*. Anyone within this path will see a total eclipse when the umbra passes over them. The much larger shaded bullseye pattern represents the penumbra. Steps in the shading denote different percentages of sun coverage (eclipse magnitude), at levels of 90%, 75%, 50%, and 25%. The yellow and orange contours map the path of the penumbra. The outermost yellow contour is the edge of the penumbra path. Outside this limit, no part of the sun is covered by the moon.

https://svs.gsfc.nasa.gov/4554

Get Ready for the 2017 Solar Eclipse

On Monday, August 21, 2017, our nation will be treated to a total eclipse of the sun.

The eclipse will be visible— weather permitting—across all of North America. The whole continent will experience a partial eclipse lasting two to three hours. Halfway through the event, anyone within a 60 to 70 mile-wide path from Oregon to South Carolina will experience a total eclipse. During those brief moments when the moon completely blocks the sun's bright face for 2+ minutes, day will turn into night, making visible the otherwise hidden *solar corona*, the sun's outer atmosphere. Bright stars and planets will become visible as well. This is truly one of nature's most awesome sights.

The eclipse provides a unique opportunity to study the sun, Earth, moon, and their interaction because of the eclipse's long path over land, from coast to coast. Scientists will be able to take ground-based and airborne observations over a period of an hour and a half to complement the wealth of data provided by NASA assets.

https://svs.gsfc.nasa.gov/12551

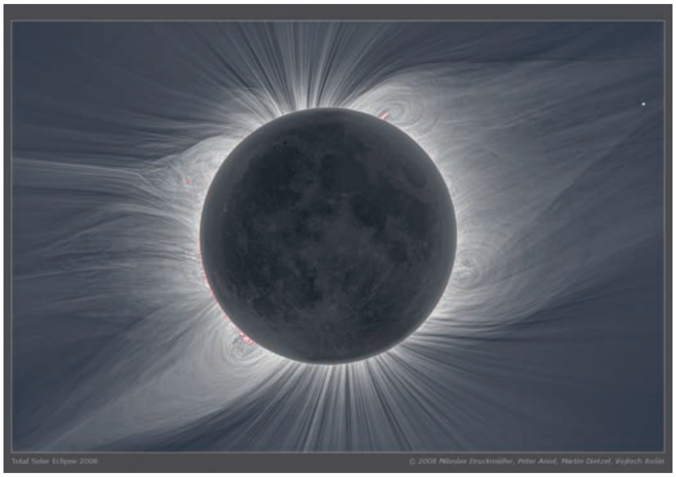
Watching the Friendly Skies - Eclipse Safety Tutorial

Get ready to view the solar eclipse with these helpful safety tips. No one should ever look directly at the sun, even during an eclipse. Many options for indirect viewing are outlined in this video.

A solar eclipse occurs when the moon blocks any part of the sun. On Monday, August 21, 2017, a solar eclipse will be visible (weather permitting) across all of North America. The whole continent will experience a partial eclipse lasting 2 to 3 hours. Halfway through the event, anyone within a roughly 70-mile-wide path from Oregon to South Carolina will experience a brief total eclipse, when the moon completely blocks the sun's bright face for up to 2 minutes 40 seconds, turning day into night and making visible the otherwise hidden *solar corona*—the sun's outer atmosphere—one of nature's most awesome sights. Bright stars and planets will become visible as well.

https://svs.gsfc.nasa.gov/12517

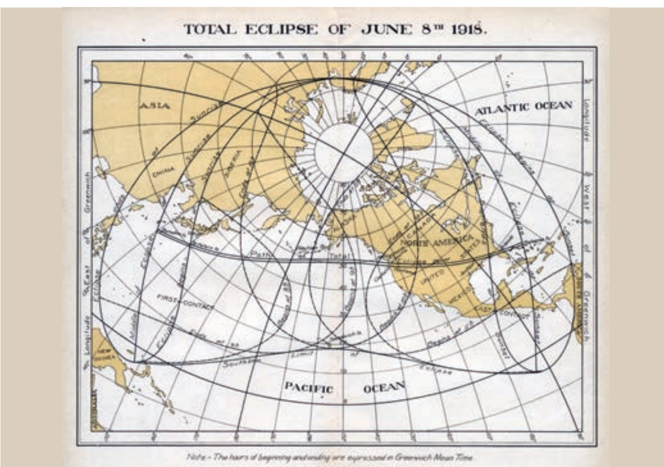
Past Eclipses and Transits



August 2008 Total Solar Eclipse

On August 1, 2008, a total solar eclipse was visible from a narrow corridor through northern Canada (Nunavut), Greenland, central Russia, eastern Kazakhstan, western Mongolia, and China. This white-light image of the solar corona was taken during the eclipse. The image has been processed to bring out the details of the corona's structure, which is difficult to capture with a camera. Credit: Miloslav Druckmüller, Peter Aniol, Martin Dietzel, Vojtech Rušin

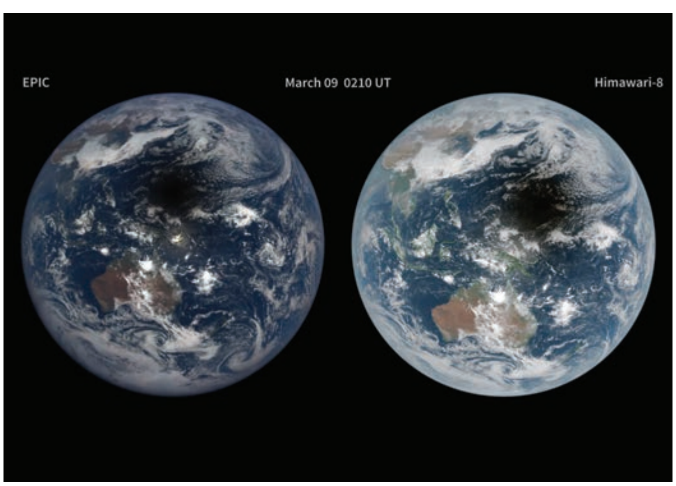
https://svs.gsfc.nasa.gov/12414



Past Eclipses

The last time a total solar eclipse spanned the contiguous United States was in 1918. The path of totality entered the U.S. through the southwest corner of Washington state and passed over Denver, Colorado, Jackson, MIssissippi, and Orlando, Florida, before exiting the country at the Atlantic coast of Florida. Shown here is a map of the 1918 total solar eclipse, from the *American Ephemeris and Nautical Almanac for the Year 1918*. This is a scan from the copy of the almanac held by the NASA Goddard library. Prior to 2017, the most recent total solar eclipse in the Lower 48 was in 1979. Totality was visible in Washington, Oregon, Idaho, Montana, and North Dakota, as well as parts of Canada and Greenland.

https://svs.gsfc.nasa.gov/4518

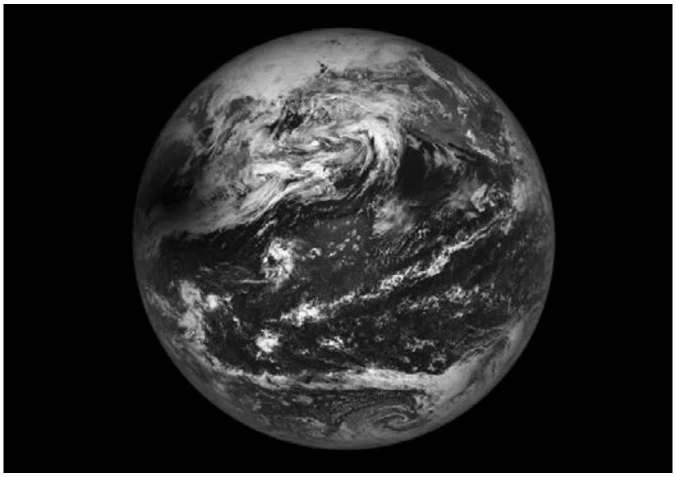


March 2016 Total Solar Eclipse

These two views of the March 2016 total solar eclipse, visible to those living in parts of Indonesia (including Sumatra, Borneo, and Sulawesi) and from locations in the Pacific Ocean, look similar but come from completely different perspectives. On the left, a series of images taken by NASA's Earth Polychromatic Imaging Camera (EPIC) on the Deep Space Climate Observatory (DSCOVR) show the eclipse from its orbit at the first Lagrange point (L1)—a point about 1,000,000 miles from Earth. As the DSCOVR spacecraft slowly orbits around L1 (always viewing the sunlit side of Earth) the area of reflected sunlight near the center of the globe remains stationary. During the eclipse, the moon's shadow crosses the face of the Earth's surface as Earth appears to rotate from left (west) to right (east) below. In contrast, Himawari-8, a Japanese weather spacecraft, is in geostationary orbit at an altitude of ~35,791 km. This means that Himawari-8 is positioned over a particular spot on Earth—located at 141 degrees East, 0 degrees North. During the eclipse, the moon's shadow appears mid-ocean and races off to the east (right), while the area of reflected sunlight appears to move right (east) to left (west) across the Earth's surface.

https://svs.gsfc.nasa.gov/30758

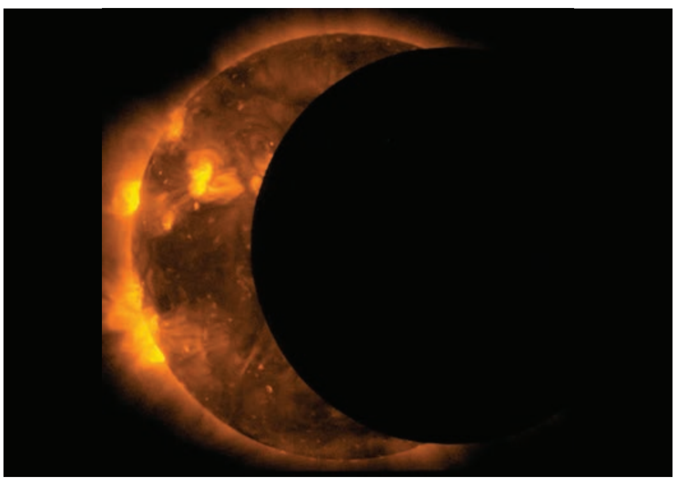
Past Eclipses and Transits



LRO Images of the May 2012 Solar Eclipse

On May 20, 2012, the Lunar Reconnaissance Orbiter (LRO) turned away from the moon so that its camera (LROC) could point at the Earth. LRO periodically uses the Earth as a target for calibrating the cameras, but in this case, it was imaging the shadow of the moon during an annular solar eclipse. The LROC narrow-angle camera (NAC) captured four images of the shadow on two successive lunar orbits.

https://svs.gsfc.nasa.gov/4525

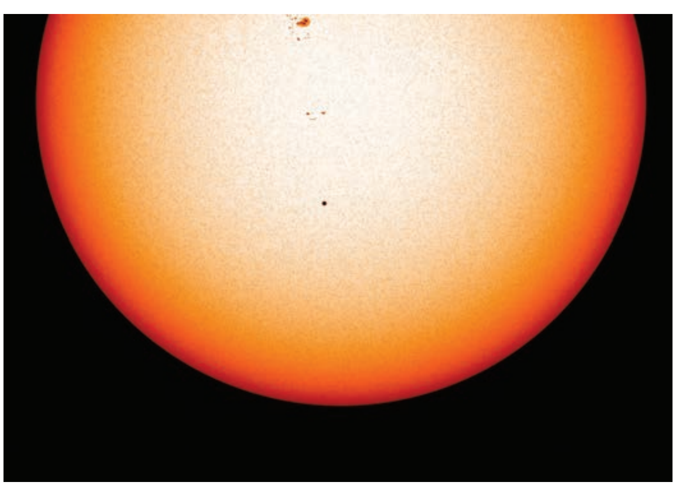


Hinode Witnesses 2012 Annular Solar Eclipse

These images from the Hinode spacecraft show the annular solar eclipse, which darkened the sky in parts of the Western United States and Southeast Asia on May 20-21, 2012.

Hinode is in a low-Earth [630 kilometers (~400 miles) altitude] sun-synchronous polar orbit that permits nearly continuous observations of the sun. In effect, Hinode has the same perspective as Earth-bound observers since the angle subtended is very small between the Earth and Hinode relative to the moon. However, Hinode's unique orbit has the spacecraft sweeping through the area occulted by the sun once per orbit, and did so 4 separate times. An annular eclipse occurs when the moon, slightly more distant from Earth than on average, moves directly between Earth and the sun, thus appearing slightly smaller to observers' eyes; the effect is a bright ring around the silhouette of the moon.

https://svs.gsfc.nasa.gov/30359



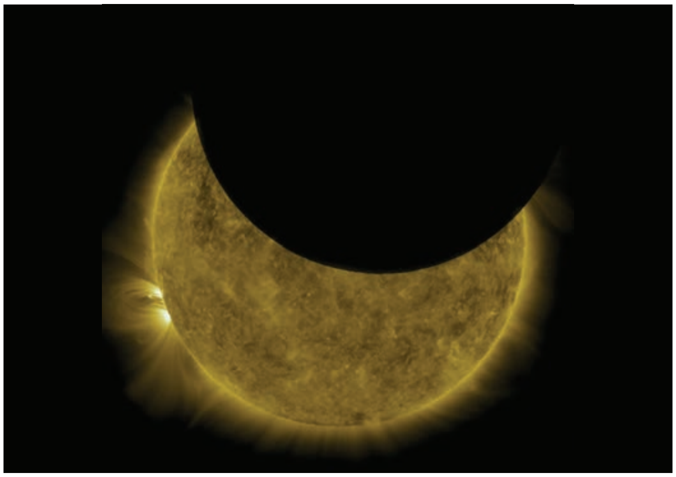
Mercury Transit, May 2016

On May 9, 2016, between about 7:12 a.m. and 2:42 p.m. EDT, Mercury passed directly between the sun and Earth. This event—which happens about 13 times each century—is called a *transit*. Like an eclipse, a transit occurs when one object appears to pass in front of another object. But in a transit, the apparent size of the first object is not large enough to cast the second into complete shadow. NASA's Solar Dynamics Observatory, or SDO, studies the sun 24/7 and captured the entire event. This visualization shows Mercury's journey across the sun.

Although Mercury zooms around the sun every 88 days, Earth, the sun, and Mercury rarely align. And because Mercury orbits in a plane that is tilted from Earth's orbit, it usually moves above or below our line of sight to the sun. Transits provide a great opportunity to study the way planets and stars move in space—information that has been used throughout the ages to better understand the solar system, and which still helps scientists today calibrate their instruments.

https://svs.gsfc.nasa.gov/30780

Past Eclipses and Transits



Lunar Transit from Solar Dynamics Observatory, 2010

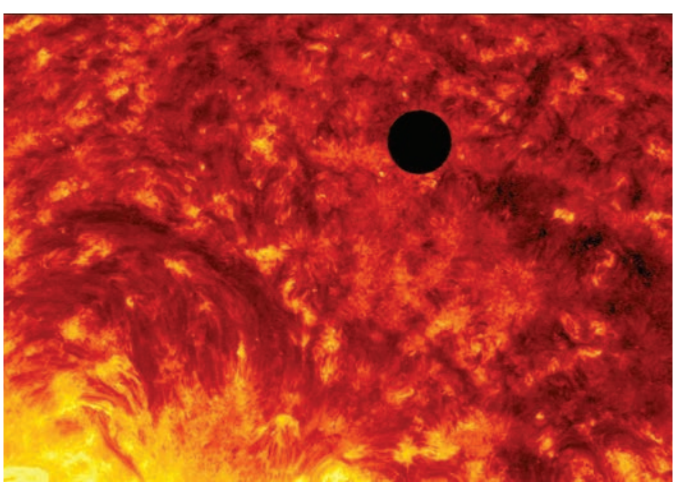
Just as we do on Earth, the Solar Dynamics Observatory, or SDO, satellite periodically crosses the moon's shadow and experiences a solar eclipse. During the eclipse witnessed by SDO on October 7, 2010, the southern hemisphere of the moon was silhouetted against the solar disk, revealing some especially prominent mountain peaks near the moon's south pole. By using elevation data from Lunar Reconnaissance Orbiter to visualize the moon from SDO's point of view, it's possible to identify these peaks. Although all of these are well-known features, none of them have official names.

https://svs.gsfc.nasa.gov/4075

Venus Transit, 2012

These visualizations were generated by compositing the small field-of-view, high-cadence closeups of Venus with the full-disk, low-cadence imagery from Solar Dynamics Observatory (SDO). Two different instruments are used: the Helioseismic and Magnetic Imager (HMI) which sees light in the visible range, and the Atmospheric Imaging Assembly (AIA) which sees light in several wavelengths in the ultraviolet range. Some artifacts may be visible from the compositing, but you have to look pretty closely to see them. The color table threshold was raised for these images, reducing the amount of noise visible in the images.

https://svs.gsfc.nasa.gov/3941

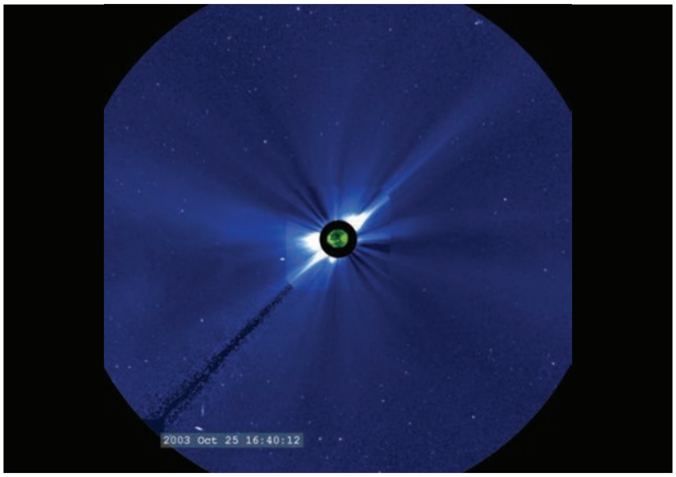


SDO's Ultra-High Definition View of the 2012 Venus Transit

Launched on February 11, 2010, the Solar Dynamics Observatory, or SDO, is the most advanced spacecraft ever designed to study the sun. During its mission, SDO has examined the sun's atmosphere, magnetic field, and also provided a better understanding of the role the sun plays in Earth's atmospheric chemistry and climate. SDO provides images with resolution 8 times better than high-definition television and returns more than a terabyte of data each day.

On June 5, 2012, SDO collected images of the rarest predictable solar event—the transit of Venus across the face of the sun. This event lasted approximately 6 hours, and happens in pairs eight years apart—which are separated from each other by 105 or 121 years. The last transit was in 2004 and the next will not happen until 2117. The videos and images displayed here are constructed from several wavelengths of extreme ultraviolet light and a portion of the visible spectrum.

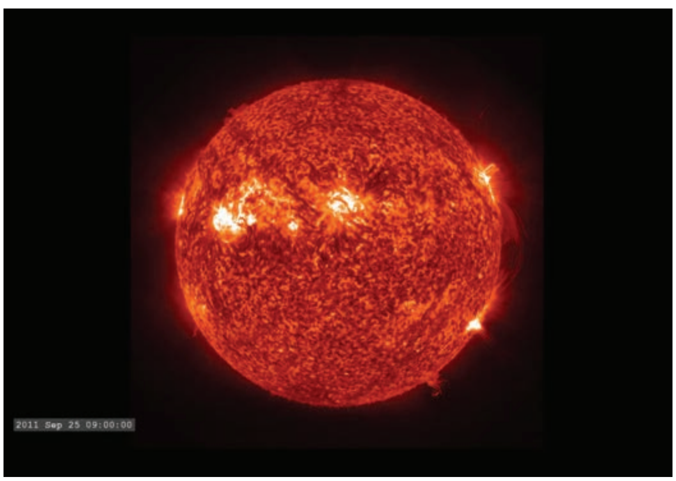
https://svs.gsfc.nasa.gov/10996



Halloween Solar Storms, 2003

Here is a view of the solar disk in 195 Ångström ultraviolet light (colored green in this movie) and the sun's extended atmosphere, or corona (blue and white in this movie). The corona is visible to the Solar and Heliospheric Observatory's (SOHO's) Large Angle and Spectrometric Coronagraph Experiment (LASCO) coronagraph instruments, which block the bright disk of the sun so the significantly fainter corona can be seen. In this movie, the inner coronagraph (designated C2) is combined with the outer coronagraph (C3). This movie covers a two week period in October and November 2003 which exhibited some of the largest solar activity events since the advent of space-based solar observing.

https://svs.gsfc.nasa.gov/3956

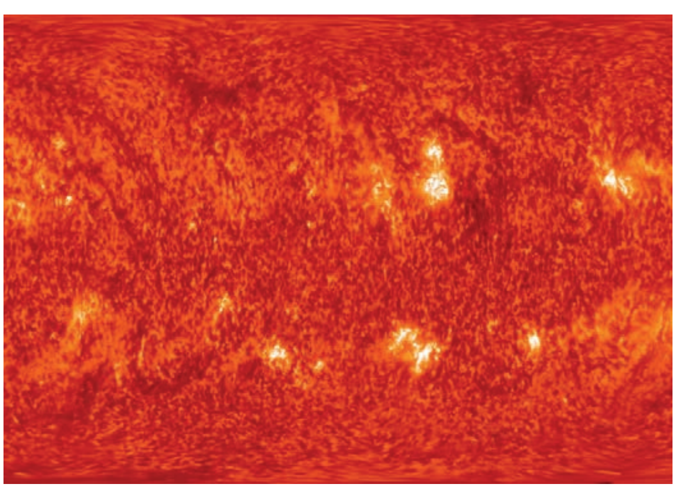


The Active Sun from SDO

The Solar Dynamics Observatory (SDO) observes the sun with many different instruments, in many different wavelengths of light. Many of these capabilities are not possible for ground-based observatories—hence the need for a space-based observing platform. This movie is generated for a wavelength of 304 Ångström (30.4 nanometers), which highlights a spectral line emitted by helium atoms that have lost 1 electron at temperatures of 50,000 K. Solar prominences are readily visible at this wavelength.

This visualization is one of a set of visualizations (others available at the link provided below) covering the same time span of 17 hours over the full wavelength range of the mission. Such visualizations are useful for illustrating how different solar phenomena, such as sunspots and active regions, look very different in different wavelengths of light. These differences enable scientists to study them more completely, with an eventual goal of improving space weather forecasting.

https://svs.gsfc.nasa.gov/3983



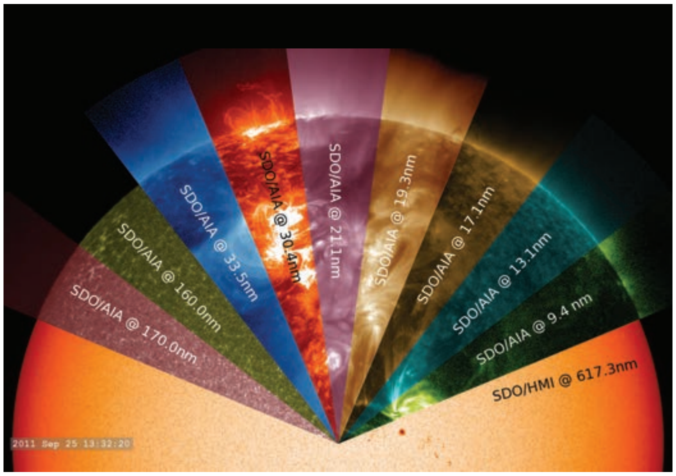
Full Map of the Sun's Surface

This movie shows the evolution of the sun's entire surface as seen in extreme ultraviolet (EUV) light (304 Ångström) for the time period January 1 - September 27, 2012. The movie was made by combining nearly simultaneous views of the sun from three spacecraft: the Solar Terrestrial Relations Observatory (STEREO) ahead and behind (seeing the sun's far side), and the Solar Dynamics Observatory (seeing the near side). This EUV light comes primarily from the solar chromosphere. The bright patches are active regions. Many dark prominence eruptions can also be seen.

The data are plotted in *Carrington coordinates*, which are "fixed" to the surface of the sun. In this coordinate system, the active regions tend to stay at the same location. However, the sun's rotation rate actually changes with latitude and this can be seen in the movie.

https://svs.gsfc.nasa.gov/30362

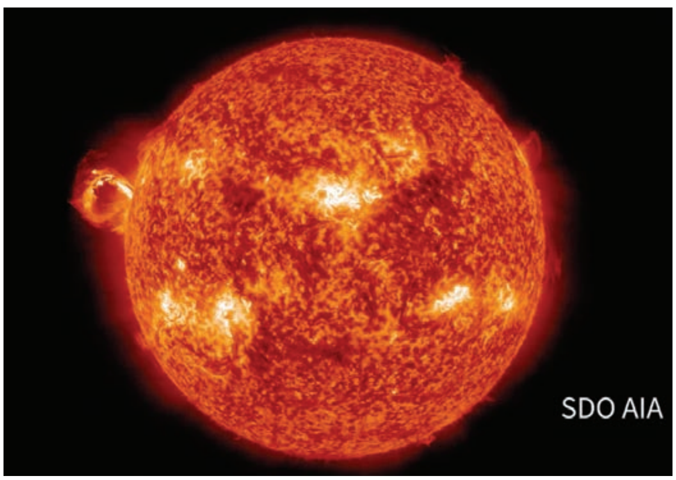
Our Sun



Solar Dynamics Observatory—Argo View

Argos (or Argus Panoptes) was the 100-eyed giant in Greek mythology. While the Solar Dynamics Observatory (SDO) has significantly less than 100 "eyes," seeing connections in the solar atmosphere through the many filters of SDO presents a number of interesting challenges. This visualization experiment illustrates a mechanism for highlighting these connections.

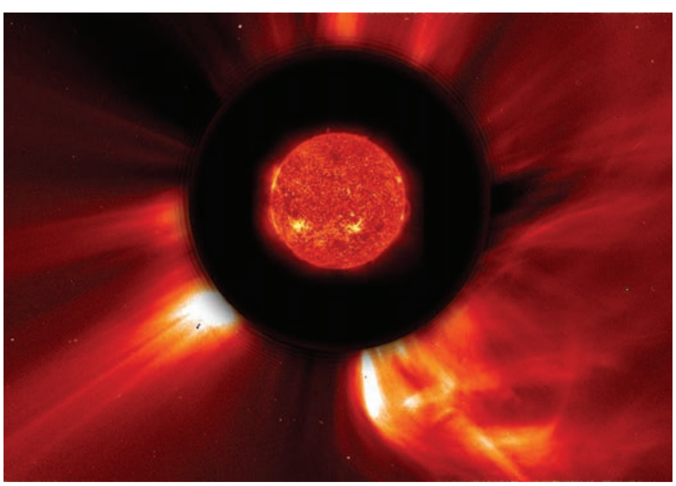
https://svs.gsfc.nasa.gov/4117



Heliophysics Fleet Captures Eruption and CME, 2013

On May 1, 2013, NASA's Solar Dynamics Observatory (SDO) watched as an active region (left) of the sun erupted with a huge cloud of solar material—a heated, charged gas called plasma. This eruption, called a coronal mass ejection, or CME, sent the plasma streaming out through the solar system. Viewing the sun in the extreme ultraviolet wavelength of 304 Ångström, SDO provided a beautiful view of the initial arc as it left the solar surface. In addition to the images captured by SDO, the CME was also observed by the European Space Agency/NASA Solar and Heliospheric Observatory (SOHO). SOHO houses two overlapping Large Angle Spectrometric Coronagraph (LASCO) telescopes where the bright sun is blocked by a disk so it does not overpower the fainter solar atmosphere. Both LASCO telescopes, named C2 and C3, observed the CME.

https://svs.gsfc.nasa.gov/30072



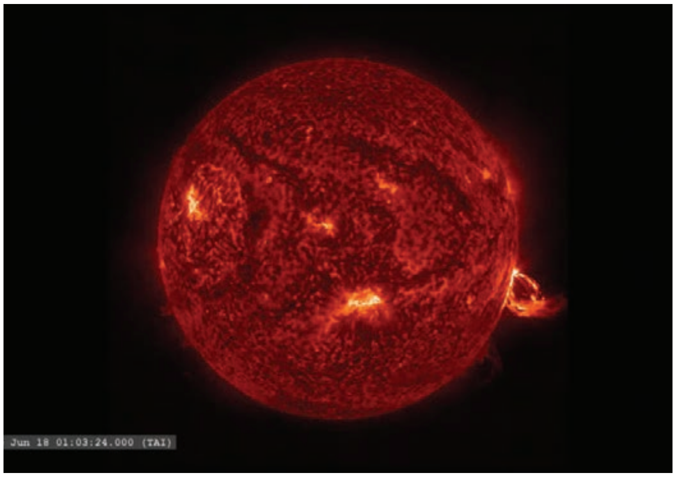
NASA's Many Views of a Massive CME, June 2012

On July 23, 2012, a massive cloud of solar material erupted off the sun's right side, zooming out into space. It soon passed one of NASA's Solar Terrestrial Relations Observatory, or STEREO, spacecraft, which clocked the coronal mass ejection (CME) as traveling between 1,800 and 2,200 miles per second as it left the sun—the fastest coronal mass ejection ever observed by STEREO. Two other observatories—NASA's Solar Dynamics Observatory and the joint European Space Agency/NASA Solar and Heliospheric Observatory—witnessed the eruption as well. The July 2012 CME didn't move toward Earth, but watching an unusually strong CME like this gives scientists an opportunity to observe how these events originate and travel through space.

STEREO's unique viewpoint from the sides of the sun combined with the other two observatories watching from closer to Earth helped scientists create models of the entire July 2012 event. They learned that an earlier, smaller CME helped clear the path for the larger event, thus contributing to its unusual speed. Such data helps advance our understanding of what causes CMEs and improves modeling of similar CMEs that could be Earth-directed.

https://svs.gsfc.nasa.gov/11558

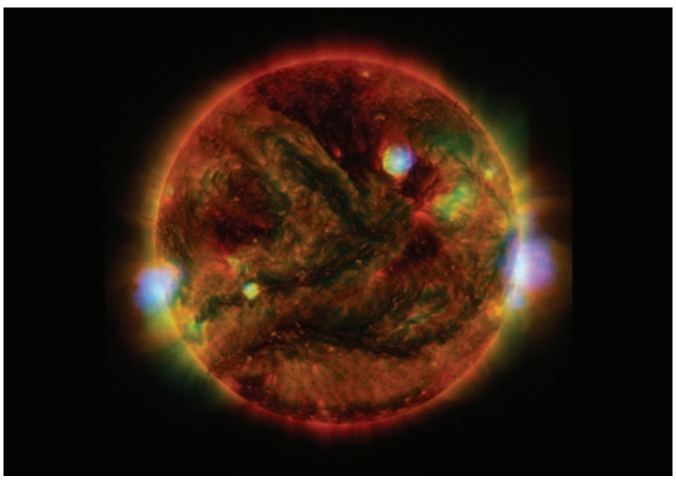
Our Sun



2015 Eruption and Coronal Loops on the Solar Limb

A prominent eruption, off the lower right limb of the sun, occurred on June 18, 2015. The eruption was followed by some complex coronal loop evolution.

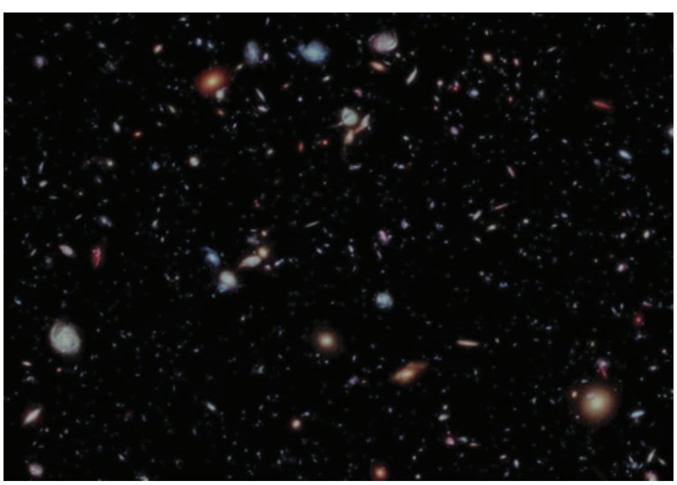
https://svs.gsfc.nasa.gov/4323



NuSTAR Stares at the Sun

Flaring, active regions of our sun are highlighted in this image from April 29, 2015, combining observations from several telescopes. High-energy X-rays from NASA's Nuclear Spectroscopic Telescope Array (NuSTAR) are shown in blue; low-energy X-rays from Japan's Hinode spacecraft are green; and extreme ultraviolet light from NASA's Solar Dynamics Observatory (SDO) is yellow and red. The NuSTAR image is a mosaic made from combining smaller images. The active regions across the sun's surface contain material heated to several millions of degrees. The blue-white areas showing the NuSTAR data pinpoint the most energetic spots. During the observations, microflares went off, which are smaller versions of the larger flares that also erupt from the sun's surface. The microflares rapidly release energy and heat the material in the active regions. Scientists plan to continue to study the sun with NuSTAR to learn more about microflares, as well as hypothesized nanoflares, which are even smaller.

https://svs.gsfc.nasa.gov/30726



Exploring the Hubble eXtreme Deep Field

In 2004, the Hubble Ultra Deep Field (HUDF) provided a ground-breaking view of distant galaxies. In 2009, those data were augmented with new infrared observations to create the HUDF-IR. In 2012, the Hubble eXtreme Deep Field (HXDF) combined those images along with a complete census of archival datasets to see yet farther into the universe. The HXDF contains roughly 5,500 galaxies stretching over 13 billion light-years of space, and represents astronomy's deepest view into the cosmos.

This scientific visualization depicts a flight through the HXDF galaxies. Using measured and estimated distances for approximately 3,000 galaxies, astronomers and visualizers constructed a three-dimensional model of the galaxy distribution. The camera traverses through the thirteen-billion-light-year dataset and ends in blackness, not because more distant galaxies do not exist, but because such galaxies have not yet been observed. For cinematic reasons, the exceedingly vast distances in the 3D model have been significantly compressed.

https://svs.gsfc.nasa.gov/30681

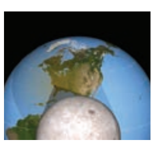
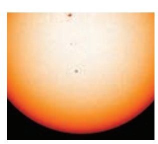
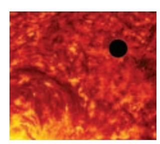
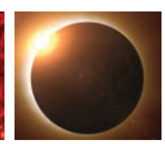
A Starry Night of Iceland

On some nights, the sky is the best show in town. On this night, the sky was not only the best show in town, but a composite image of the sky won an international competition for landscape astrophotography. The winning image was taken over Jökulsárlón, the largest glacial lake in Iceland. The photographer combined six exposures to capture not only two green auroral rings, but their reflections off the serene lake. Visible in the distant background sky is the band of our Milky Way Galaxy, the Pleiades open clusters of stars, and the Andromeda galaxy. A powerful coronal mass ejection from the sun caused auroras to be seen as far south as Wisconsin. Credit: Stephane Vetter (Nuits sacrees)

https://apod.nasa.gov/apod/ap110517.html

NOTES

NASA Hyperwall Science Stories

svs.gsfc.nasa.gov/hw

National Aeronautics and Space Administration

www.nasa.gov

07/2017