EARLIEST SUNRISES BEFORE SUMMER SOLSTICE

June sunrise over Currituck, North Carolina.

At mid-northern latitudes in the Northern Hemisphere, your earliest sunrises of the year happen around mid-June, despite the fact that the summer solstice – the year's longest day – is still about a week away. **And if you live at middle latitudes in the Southern Hemisphere, your earliest sunsets take place around now, even though the winter solstice – your shortest day – isn't for another week**.

For the Southern Hemisphere: If you're someone who relishes the day's light, as many do, you'll be glad to know the sunsets will soon be shifting later!

The exact date of earliest sunrise (and earliest sunset) varies with latitude. At 40 degrees north latitude – the latitude of, say, Philadelphia in Pennsylvania – the earliest sunrise of the year will happen on June 14. For that same latitude, the latest sunset of the year will fall on or near June 27. Meanwhile, the longest day of the year – the day containing the greatest amount of daylight, overall – comes on the solstice on June 21. The dates of earliest sunrise and latest sunset don't coincide exactly with the solstice.

Appreciably south of Philadelphia's latitude, the earliest sunrise has already come and gone (in late May or early June) and the latest sunset occurs at a later date (sometimes as late as July). In Hawaii, for instance, the earliest sunrise precedes the June solstice by about two weeks, and the latest sunset comes about two weeks after. Farther north, the earliest sunrise and latest sunset happen closer to the June solstice.

The earliest sunrises come before the summer solstice because the day is more than 24 hours long at this time of the year. In the Southern Hemisphere, the earliest sunsets of the year come before the winter solstice for the same reason.

In June, the day (as measured by successive returns of the midday sun) is nearly 1/4 minute longer than 24 hours. Hence, the midday sun (solar noon) comes later by the clock on the June solstice than it does one week before. Therefore, the sunrise and sunset times also come later by the clock.

The primary reason for the earliest sunrise preceding the summer solstice (and the earliest sunset preceding the winter solstice) is the inclination of the Earth's rotational axis. The earliest sunrise or sunset would take place before the solstice even if the Earth went around the Sun in a circular orbit.

However, the Earth's elliptical orbit does affect the severity of the phenomenon. At the June solstice, Earth in its orbit is rather close to aphelion – its farthest point from the Sun – which lessens the effect. At the December solstice, Earth is rather close to perihelion – its closest point to the Sun – which accentuates it.

At middle latitudes, the earliest sunrise/sunset comes about one week before the June summer/winter solstice, and the latest sunset/sunrise about one week after the June solstice.

Yet, at the other end of the year, at middle latitudes, the earliest sunset/sunrise comes about two weeks before the December winter/summer solstice, and the latest sunrise/sunset about two weeks after the December solstice.

What is a solstice? Ancient cultures knew that the Sun's path across the sky, the length of daylight, and the location of the sunrise and sunset all shifted in a regular way throughout the year. They built monuments, such as Stonehenge, to follow the Sun's yearly progress.


Waiting for dawn at Stonehenge, summer solstice 2005.

Today, we know that the solstice is an astronomical event, caused by Earth's tilt on its axis and its motion in orbit around the Sun.

It's because Earth doesn't orbit upright. Instead, our world is tilted on its axis by 23 1/2 degrees, Earth's Northern and Southern Hemispheres trade places in receiving the Sun's light and warmth most directly.

At the June solstice, Earth is positioned in its orbit so that our world's North Pole is leaning most toward the Sun. As seen from Earth, the sun is directly overhead at noon 23 1/2 degrees north of the equator, at an imaginary line encircling the globe known as the Tropic of Cancer – named after the constellation Cancer the Crab. This is as far north as the Sun ever gets.

AK, with EarthSky Notes