

Winter solstice

The **winter solstice**, also called the **hiemal solstice**, **hibernal solstice**, and **brumal solstice**, occurs when either of Earth's poles reaches its maximum tilt away from the Sun. This happens twice yearly, once in each hemisphere (Northern and Southern). For that hemisphere, the winter solstice is the day with the shortest period of daylight and longest night of the year, when the Sun is at its lowest daily maximum elevation in the sky.^[3] Either pole experiences continuous darkness or twilight around its winter solstice. The opposite event is the summer solstice. Depending on the hemisphere's winter solstice, at the Tropic of Cancer or Capricorn, the Sun reaches 90° below the observer's horizon at solar midnight, to the nadir.

The winter solstice occurs during the hemisphere's winter. In the Northern Hemisphere, this is the December solstice (usually December 21 or 22) and in the Southern Hemisphere, this is the June solstice (usually June 20 or 21). Although the winter solstice itself lasts only a moment, the term sometimes refers to the day on which it occurs. Other names are the "extreme of winter" (Dongzhi), or the "shortest day". Since the 18th century, the term "midwinter" has sometimes been used synonymously with the winter solstice, although it carries other meanings as well. Traditionally, in many temperate regions, the winter solstice is seen as the middle of winter, but today in some countries and calendars, it is seen as the beginning of winter.

Since prehistory, the winter solstice has been seen as a significant time of year in many cultures, and has been marked by festivals and rituals.^[4] It marked the symbolic death and rebirth of the Sun.^{[5][6][7]} The seasonal significance of the winter solstice is in the reversal of the gradual lengthening of nights and shortening of days.

UT date and time of
equinoxes and solstices on Earth^{[1][2]}

event	<u>equinox</u>		<u>solstice</u>		<u>equinox</u>		<u>solstice</u>	
month	March		June		September		December	
year	day	time	day	time	day	time	day	time
2016	20	04:31	20	22:35	22	14:21	21	10:45
2017	20	10:29	21	04:25	22	20:02	21	16:29
2018	20	16:15	21	10:07	23	01:54	21	22:22
2019	20	21:58	21	15:54	23	07:50	22	04:19
2020	20	03:50	20	21:43	22	13:31	21	10:03
2021	20	09:37	21	03:32	22	19:21	21	15:59
2022	20	15:33	21	09:14	23	01:04	21	21:48
2023	20	21:25	21	14:58	23	06:50	22	03:28
2024	20	03:07	20	20:51	22	12:44	21	09:20
2025	20	09:02	21	02:42	22	18:20	21	15:03
2026	20	14:46	21	08:25	23	00:06	21	20:50

Winter solstice



At the Lawrence Hall of Science in California, visitors observe sunset on the day of the winter solstice using the Sunstones II.

Also called	the Longest Night
Observed by	Various cultures
Type	Cultural, astronomical
Significance	Astronomically marks the beginning of lengthening days and shortening nights

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Celebrations Festivals, spending time with loved ones, feasting, singing, dancing, fires

Date about December 21 (NH)
about June 21 (SH)

Frequency Twice a year (once in the northern hemisphere, once in the southern hemisphere, six months apart)

Related to Winter festivals and the solstice

History and cultural significance

The solstice may have been a special moment of the annual cycle for some cultures even during Neolithic times. Astronomical events were often used to guide activities, such as the mating of animals, the sowing of crops and the monitoring of winter reserves of food. Many cultural mythologies and traditions are derived from this.

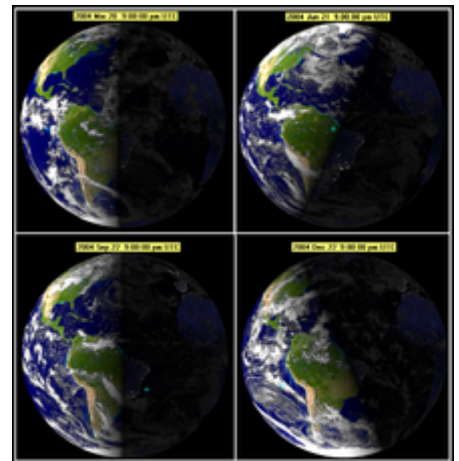
This is attested by physical remains in the layouts of late Neolithic and Bronze Age archaeological sites, such as Stonehenge in England and Newgrange in Ireland. The primary axes of both of these monuments seem to have been carefully aligned on a sight-line pointing to the winter solstice sunrise (Newgrange) and the winter solstice sunset (Stonehenge). It is significant that at Stonehenge the Great Trilithon was oriented outwards from the middle of the monument, i.e. its smooth flat face was turned towards the midwinter Sun.^[8]

The winter solstice was immensely important because the people were economically dependent on monitoring the progress of the seasons. Starvation was common during the first months of the winter, January to April (northern hemisphere) or July to October (southern hemisphere), also known as "the famine months". In temperate climates, the midwinter festival was the last feast celebration, before deep winter began. Most cattle were slaughtered so they would not have to be fed during the winter, so it was almost the only time of year when a plentiful supply of fresh meat was available.^[9] The majority of wine and beer made during the year was finally fermented and ready for drinking at this time. The concentration of the observances were not always on the day commencing at midnight or at dawn, but at the beginning of the pagan day, which in many cultures fell on the previous eve.

Because the event was seen as the reversal of the Sun's ebbing presence in the sky, concepts of the birth or rebirth of sun gods have been common. In cultures which used cyclic calendars based on the winter solstice, the "year as reborn" was celebrated with reference to life-death-rebirth deities or "new beginnings" such as Hogmanay's redding, a New Year cleaning tradition. Also "reversal" is yet another frequent theme, as in Saturnalia's slave and master reversals.



Japanese Sun goddess Amaterasu emerging from a cave (by Kunisada)



Winter solstice occurs in December for the northern hemisphere, and June for the southern hemisphere.

Indian

Makara Sankranti, also known as Makaraa Sankrānti (Sanskrit: मकर संक्रांति) or Maghi, is a festival day in the Hindu calendar, in reference to deity Surya (sun). It is observed each year in January.^[10] It marks the first day of Sun's transit into Makara (Capricorn), marking the end of the month with the winter solstice and the start of longer days.^{[10][11]} In India, this occasion, known as Ayan Parivartan (Sanskrit: अयन परिवर्तन), is celebrated by religious Hindus as a holy day, with Hindus performing customs such as bathing in holy rivers, giving alms and donations, praying to deities and doing other holy deeds.

Iranian

Iranian people celebrate the night of the Northern Hemisphere's winter solstice as, "Yalda night", which is known to be the "longest and darkest night of the year". Yalda night celebration, or as some call it "Shabe Chelleh" ("the 40th night"), is one of the oldest Iranian traditions that has been present in Persian culture from ancient times. In this night all the family gather together, usually at the house of the eldest, and celebrate it by eating, drinking and reciting poetry (esp. Hafez). Nuts, pomegranates and watermelons are particularly served during this festival.

East Asian

In East Asia, the winter solstice has been celebrated as one of the Twenty-four Solar Terms, called Dongzhi in Chinese. In Japan, in order not to catch cold in the winter, there is a custom to soak oneself in a yuzu hot bath (Japanese: 柚子湯 = Yuzuyu).^[12]



Sunlight directed through the 17 arches of Seventeen Arch Bridge, Summer Palace, Beijing around winter solstice

Judaic

An Aggadic legend found in tractate Avodah Zarah 8a puts forth the talmudic hypothesis that Adam first established the tradition of fasting before the winter solstice, and rejoicing afterward, which festival later developed into the Roman Saturnalia and Kalendae.

Germanic

The pagan Scandinavian and Germanic people of northern Europe celebrate a winter holiday called Yule (also called Jul, Julblot, jólablót). The Heimskringla, written in the 13th century by the Icelander Snorri Sturluson, describes a Yule feast hosted by the Norwegian king Haakon the Good (c. 920–961). According to Snorri, the Christian Haakon had moved Yule from "midwinter" and aligned it with the Christian Christmas celebration. Historically, this has made some scholars believe that Yule originally was a sun festival on the winter solstice. Modern scholars generally do not believe this, as midwinter in medieval Iceland was a date about four weeks after the solstice.^[13]

Roman cult of Sol

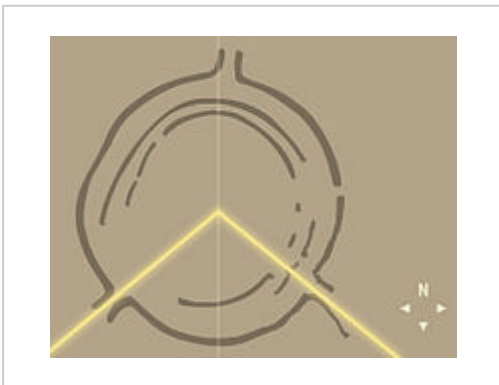
Sol Invictus ("The Unconquered Sun/Invincible Sun") was originally a Syrian god who was later adopted as the chief god of the Roman Empire under Emperor Aurelian.^[14] His holiday is traditionally celebrated on December 25, as are several gods associated with the winter solstice in many pagan traditions.^[15] It has been speculated to be the reason behind Christmas' proximity to the solstice.^[16]

Observations

Although the instant of the solstice can be calculated,^[17] direct observation of the solstice by amateurs is impossible because the Sun moves too slowly or appears to stand still (the meaning of "solstice"). However, by use of astronomical data tracking, the precise timing of its occurrence is now public knowledge. One cannot directly detect the precise instant of the solstice (by definition, one cannot observe that an object has stopped moving until one later observes that it has not moved further from the preceding spot, or that it has moved in the opposite direction). Furthermore, to be precise to a single day, one must be able to observe a change in azimuth or elevation less than or equal to about 1/60 of the angular diameter of the Sun. Observing that it occurred within a two-day period is easier, requiring an observation precision of only about 1/16 of the angular diameter of the Sun. Thus, many observations are of the day of the solstice rather than the instant. This is often done by observing sunrise and sunset or using an astronomically aligned instrument that allows a ray of light to be cast on a certain point around that time. The earliest sunset and latest sunrise dates differ from winter solstice, however, and these depend on latitude, due to the variation in the solar day throughout the year caused by the Earth's elliptical orbit (see earliest and latest sunrise and sunset).



Sunlight entering the Passage Tomb during sunrise of the Winter Solstice in Newgrange, Ireland



Neolithic site of Goseck circle in Germany. The yellow lines indicate the directions in which sunrise and sunset are seen on the day of the winter solstice.

Sunrise at Stonehenge in southern England on the winter solstice

Holidays celebrated on the winter solstice

- Alban Arthan (Welsh)
- Blue Christmas (holiday) (Western Christian)
- Brumalia (Ancient Rome)
- Dongzhi Festival (East Asia)
- Korochun (Slavic)
- Sanghamitta Day (Theravada Buddhism)
- Shalako (Zuni)
- Yaldā (Iran)
- Yule in the Northern Hemisphere (Neopagan)

- Ziemassvētki (ancient Latvia)
- Midwinter Day (Antarctica)















Other related festivals

- Saturnalia (Ancient Rome): Celebrated shortly before winter solstice
- Saint Lucy's Day (Christian): Used to coincide with the winter solstice day
- Christmas: Takes place shortly after winter solstice, absorbed tradition from winter solstice celebration. Speculated to originate from solstice date, see Christmas#Solstice date and Dies Natalis Solis Invicti
- Cold Food Festival (Korea, Greater China): 105 days after winter solstice
- Makar Sankranti / Pongal (India): Harvest Festival – Marks the end of the cold months and start of the new Month with longer days.

Length of the day near the northern winter solstice

The following tables contain information on the length of the day on December 22nd, close to the winter solstice of the Northern Hemisphere and the summer solstice of the Southern Hemisphere (i.e. December solstice). The data was collected from the website of the Finnish Meteorological Institute on 22 December 2015, as well as from certain other websites.^{[18][19][20][21][22][23]}











The data is arranged geographically and within the tables from the shortest day to the longest one.

The Nordic countries and the Baltic states			
City	Sunrise 22 Dec 2015	Sunset 22 Dec 2015	Length of the day
 <u>Murmansk</u>	—	—	0 h
 <u>Bodø</u>	11:36	12:25	0 h 49 min
 <u>Rovaniemi</u>	11:08	13:22	2 h 14 min
 <u>Luleå</u>	9:55	13:04	3 h 08 min
 <u>Reykjavík</u>	11:22	15:29	4 h 07 min
 <u>Trondheim</u>	10:01	14:31	4 h 30 min
 <u>Tórshavn</u>	9:51	14:59	5 h 08 min
 <u>Helsinki</u>	9:24	15:13	5 h 49 min
 <u>Oslo</u>	9:18	15:12	5 h 54 min
 <u>Tallinn</u>	9:17	15:20	6 h 02 min
 <u>Stockholm</u>	8:43	14:48	6 h 04 min
 <u>Riga</u>	9:00	15:43	6 h 43 min
 <u>Copenhagen</u>	8:37	15:38	7 h 01 min
 <u>Vilnius</u>	8:40	15:54	7 h 14 min




Europe			
City	Sunrise 22 Dec 2015	Sunset 22 Dec 2015	Length of the day
 <u>Edinburgh</u>	8:42	15:40	6 h 57 min
 <u>Moscow</u>	8:57	15:58	7 h 00 min
 <u>Berlin</u>	8:15	15:54	7 h 39 min
 <u>Warsaw</u>	7:43	15:25	7 h 42 min
 <u>London</u>	8:04	15:53	7 h 49 min
 <u>Kyiv</u>	7:56	15:56	8 h 00 min
 <u>Paris</u>	8:41	16:56	8 h 14 min
 <u>Vienna</u>	7:42	16:03	8 h 20 min
 <u>Budapest</u>	7:28	15:55	8 h 26 min
 <u>Rome</u>	7:34	16:42	9 h 07 min
 <u>Madrid</u>	8:34	17:51	9 h 17 min
 <u>Lisbon</u>	7:51	17:18	9 h 27 min
 <u>Athens</u>	7:37	17:09	9 h 31 min

Africa			
City	Sunrise 22 Dec 2015	Sunset 22 Dec 2015	Length of the day
 <u>Cairo</u>	6:47	16:59	10 h 12 min
 <u>Tenerife</u>	7:53	18:13	10 h 19 min
 <u>Dakar</u>	7:30	18:46	11 h 15 min
 <u>Addis Ababa</u>	6:35	18:11	11 h 36 min
 <u>Nairobi</u>	6:25	18:37	12 h 11 min
 <u>Kinshasa</u>	5:45	18:08	12 h 22 min
 <u>Dar es Salaam</u>	6:05	18:36	12 h 31 min
 <u>Luanda</u>	5:46	18:24	12 h 38 min
 <u>Antananarivo</u>	5:10	18:26	13 h 16 min
 <u>Windhoek</u>	6:04	19:35	13 h 31 min
 <u>Johannesburg</u>	5:12	18:59	13 h 47 min
 <u>Cape Town</u>	5:32	19:57	14 h 25 min

Middle East

City	Sunrise 22 Dec 2015	Sunset 22 Dec 2015	Length of the day
 <u>Tehran</u>	7:10	16:55	9 h 44 min
 <u>Beirut</u>	6:39	16:33	9 h 54 min
 <u>Baghdad</u>	7:02	16:59	9 h 57 min
 <u>Jerusalem</u>	6:35	16:39	10 h 04 min
 <u>Manama</u>	6:21	16:51	10 h 30 min
 <u>Doha</u>	6:15	16:49	10 h 34 min
 <u>Dubai</u>	7:00	17:34	10 h 34 min
 <u>Riyadh</u>	6:32	17:10	10 h 37 min
 <u>Muscat</u>	6:43	17:23	10 h 41 min
 <u>Sana'a</u>	6:25	17:38	11 h 13 min

Americas

City	Sunrise 22 Dec 2015	Sunset 22 Dec 2015	Length of the day
 <u>Inuvik</u>	—	—	0 h
 <u>Fairbanks</u>	10:58	14:40	3 h 41 min
 <u>Nuuk</u>	10:22	14:28	4 h 06 min
 <u>Anchorage</u>	10:14	15:42	5 h 27 min
 <u>Edmonton</u>	8:48	16:15	7 h 27 min
 <u>Vancouver</u>	8:05	16:16	8 h 11 min
 <u>Seattle</u>	7:55	16:20	8 h 25 min
 <u>Ottawa</u>	7:39	16:22	8 h 42 min
 <u>Toronto</u>	7:48	16:43	8 h 55 min
 <u>New York City</u>	7:16	16:32	9 h 15 min
 <u>Washington, D.C.</u>	7:23	16:49	9 h 26 min
 <u>Los Angeles</u>	6:55	16:48	9 h 53 min
 <u>Dallas</u>	7:25	17:25	9 h 59 min
 <u>Miami</u>	7:03	17:35	10 h 31 min
 <u>Honolulu</u>	7:04	17:55	10 h 50 min
 <u>Mexico City</u>	7:06	18:03	10 h 57 min
 <u>Managua</u>	6:01	17:26	11 h 24 min
 <u>Bogotá</u>	5:59	17:50	11 h 51 min
 <u>Quito</u>	6:08	18:16	12 h 08 min
 <u>Recife</u>	5:00	17:35	12 h 35 min
 <u>Lima</u>	5:41	18:31	12 h 50 min
 <u>La Paz</u>	5:57	19:04	13 h 06 min
 <u>Rio de Janeiro</u>	6:04	19:37	13 h 33 min
 <u>São Paulo</u>	6:17	19:52	13 h 35 min
 <u>Porto Alegre</u>	6:20	20:25	14 h 05 min
 <u>Santiago</u>	6:29	20:52	14 h 22 min
 <u>Buenos Aires</u>	5:37	20:06	14 h 28 min
 <u>Ushuaia</u>	4:51	22:11	17 h 19 min

Asia and Oceania			
City	Sunrise 22 Dec 2015	Sunset 22 Dec 2015	Length of the day
 Magadan	8:54	14:55	6 h 00 min
 Petropavlovsk	9:36	17:10	7 h 33 min
 Khabarovsk	8:48	17:07	8 h 18 min
 Ulaanbaatar	8:39	17:02	8 h 22 min
 Vladivostok	8:40	17:40	8 h 59 min
 Beijing	7:32	16:52	9 h 20 min
 Seoul	7:44	17:17	9 h 34 min
 Tokyo	6:47	16:31	9 h 44 min
 Shanghai	6:48	16:55	10 h 07 min
 Lhasa	8:46	19:01	10 h 14 min
 Delhi	7:09	17:28	10 h 19 min
 Hong Kong	6:58	17:44	10 h 46 min
 Manila	6:16	17:32	11 h 15 min
 Bangkok	6:36	17:55	11 h 19 min
 Singapore	7:01	19:04	12 h 03 min
 Jakarta	5:36	18:05	12 h 28 min
 Denpasar	5:58	18:36	12 h 37 min
 Darwin	6:19	19:10	12 h 51 min
 Papeete	5:21	18:32	13 h 10 min
 Brisbane	4:49	18:42	13 h 52 min
 Perth	5:07	19:22	14 h 14 min
 Sydney	5:41	20:05	14 h 24 min
 Auckland	5:58	20:39	14 h 41 min
 Melbourne	5:54	20:42	14 h 47 min
 Invercargill	5:50	21:39	15 h 48 min

Length of day increases from the equator towards the South Pole in the Southern Hemisphere in December (around the summer solstice there), but decreases towards the North Pole in the Northern Hemisphere at the time of the northern winter solstice.

See also

-
- [Dongzhi](#)
 - [Burning the Clocks](#)
 - [Christmas in July](#)
 - [December solstice](#)
 - [Effect of sun angle on climate](#)
 - [Equinox](#)
 - [Festival of Lights \(disambiguation\)](#)
 - [Festive ecology](#)
 - [Festivus](#)
 - [Halcyon days](#)
 - [Hanukkah](#)
 - [HumanLight](#)
 - [June solstice](#)
 - [Koliada](#)
 - [Kwanzaa](#)
 - [Lohri](#)
 - [Makar Sankranti](#)
 - [Midsummer](#)
 - [Summer solstice](#)
 - [Thai Pongal](#)
 - [Tekufah](#)
 - [Tiregān](#)
 - [Yaldā Night](#)
 - [Analemma](#)

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External links

- [Table of times/dates from 1600–2400](http://www.neoprogrammics.com/sun/Northern_Winter_Dates_and_Times.html) (http://www.neoprogrammics.com/sun/Northern_Winter_Dates_and_Times.html)

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