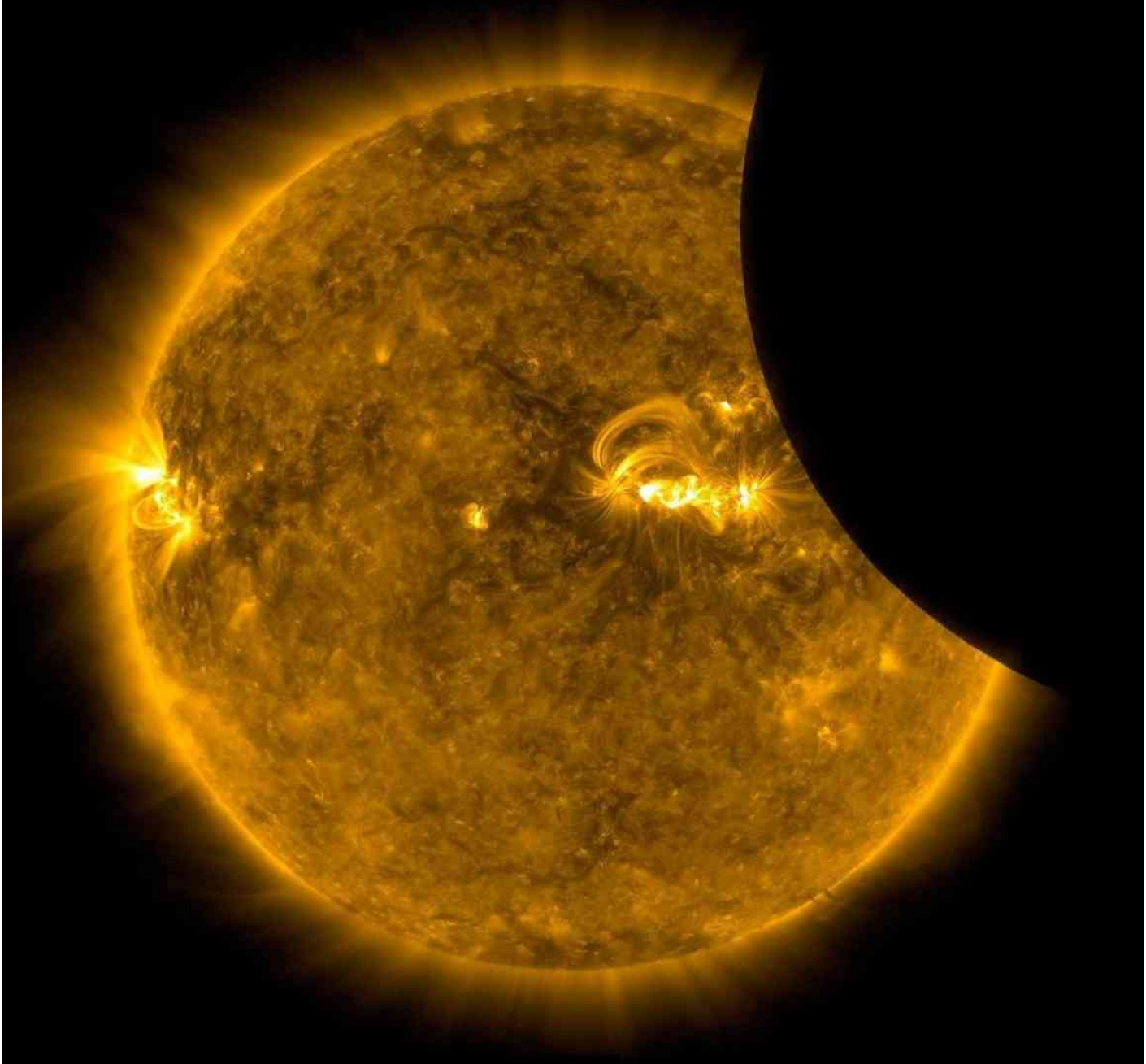
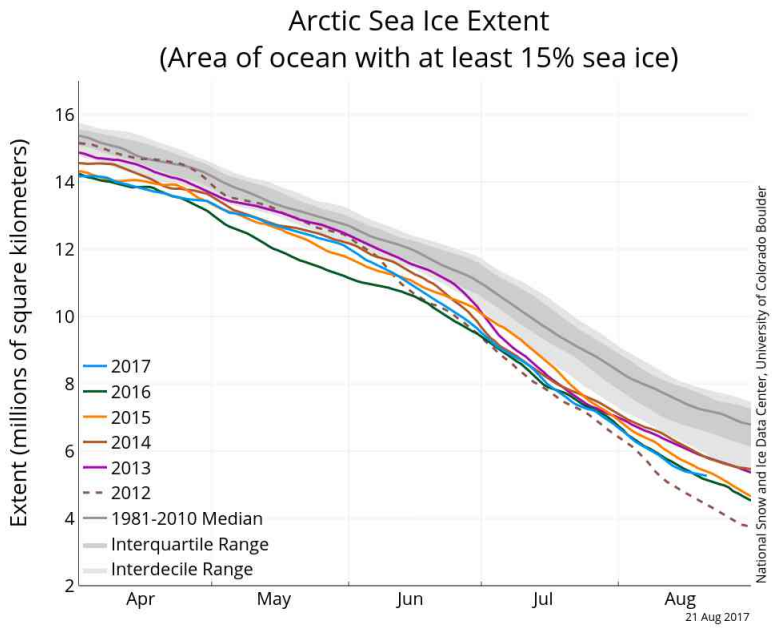
Prime Meridian

(76) August 30, 2017



The solar eclipse of August 21, 2017 was experienced as total in a narrow swathe across the USA, where huge crowds flocked to watch the spectacle, and as partial in many other places. A partial eclipse was also seen from NASA's Solar Dynamics Observatory, which is in a geosynchronous orbit around our planet. This image was obtained on Aug. 21, 2017 at 19:41:46 UT. It was taken in the extreme ultra-violet at 171 Å. Loops of tenuous incandescent matter reveal the structure of the magnetic field around active sunspot areas.

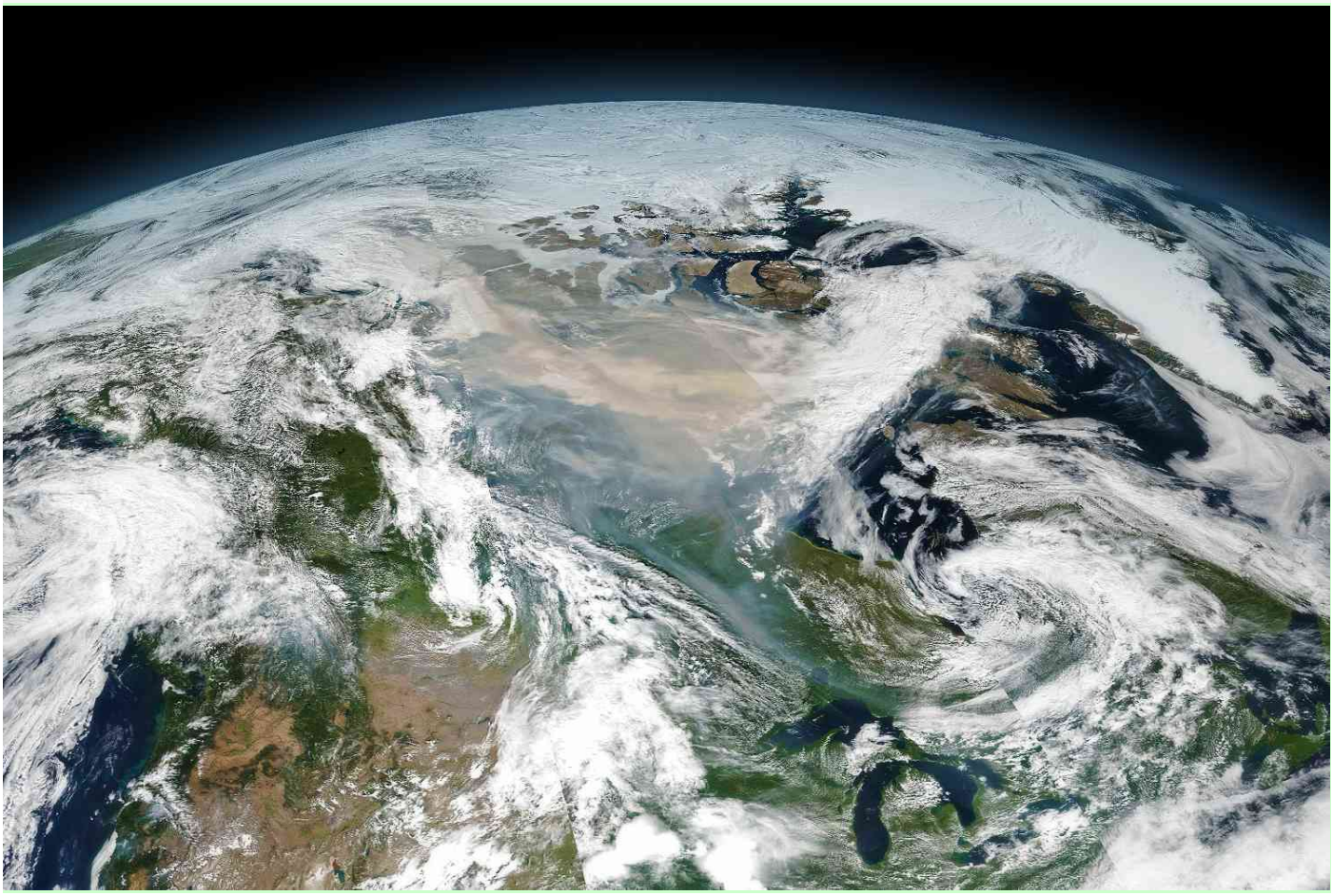
Image credit: NASA/SDO



We can now be certain that 2017 will not set a record for the loss of Arctic sea ice.

Ice loss slows in August, and data published by the USA's National Snow and Ice Data Center reveals that the extent of the sea ice is very similar to that at this time last year. On August 21, 2017 its extent was 5.27 million km^2. This was 1.82 million km^2 lower than the 1981 to 2010 median extent for this date, but 804,000 km^2 higher than 2012 and 221,000 km^2 higher than 2007. Climate scientists continue to debate the date when the extent of Arctic sea ice will fall below one million km^2, which will be taken as its *de facto* summer disappearance.

Below: From the Great Lakes to the Pole. This view of the northern latitudes, showing the entirety of Greenland and looking across the icy Arctic Basin is a mosaic of several overpasses on August 15 by the Visible Infrared Imaging Radiometer Suite (VIIRS) on the Suomi NPP satellite. It also shows massive fires in progress and a huge pall of smoke over Canada. NASA reported: "*For more than a month, dozens of large fires raged in British Columbia. Since early July 2017, wildfire has burned through coniferous forests stressed by heat, drought, and infestations of mountain pine beetles. In early August, another cluster of intense fires flared up in Northwest Territories when a cold front pushed through the region with powerful winds. . . . The fires in BC were so intense that they produced several pyrocumulus clouds, lofting smoke up to 13 kilometers (8 miles) into the atmosphere.*"



Seasons in South East England

June, 2017

Above: Elder (*Sambucus nigra*) flowers in profusion along a hedgerow between two fields at Ash, Kent. June 4, 2017.

June 2017 was sunnier and warmer than normal, but also saw more rain.

For the UK as a whole, the mean temperature was 14.5°C, 1.5°C above the 1981-2010 long-term average. England's (15.9°C) was 1.9°C above the mean. The second warmest of the Met Office's regions was England SE and Central S, which enjoyed 16.9°C (2.1°C above its norm). The warmest was East Anglia at 17.2°C, and this also saw the greatest departure from the norm, namely 2.5°C.

Left (from top): Apparent storm damage in a field at Bean, Kent. June 2. Green wheat ripening in a field near West Kingsdown, Kent, on June 4. Sloes ripen in an adjacent hedgerow (June 3). Below: Bluebells gone to seed in the midst of a carpet of dog's mercury (June 3) in Saxten's & Cage's Wood, Kent.

Above: June 4, 2017. A former coppice near Ash, Kent. On the woodland floor, anemones have ceased flowering and their leaves are yellowing.

The month began with unsettled weather. The temperature on June 1 was 25.5°C at Heathrow, but it then fell every day until June 6, when it sank to 17.5°C. The coldest day at Heathrow (around 9.5°C) was on June 4, but the UK's lowest temperature (-2.3°C) was recorded on June 8 at Altnaharra (Sutherland, in the Scottish Highlands). Heathrow saw about 7 mm of rain on June 2 and around 18 mm on June 6.

More settled weather came in from June 10, followed by an influx of warm air from the south on June 16. The Met Office recorded that every day between June 17 and June 21 (the day of the summer solstice) a temperature of over 30°C was recorded from some UK location. The UK's highest temperature for June, 34.5°C, was recorded at Heathrow (missing from the WeatherOnline series) on June 21.

Right: June 4. Hedge woundwort (*Stachys sylvatica*) flowering in the churchyard of St Peter and St Paul, Ash, Kent.

Below: June 6. Onion grass (*Allium vineale*), noted for its invasive behaviour, pokes up its head with attractive red bulbils, on the edge of a field on the hillside above Pinden, Kent.

Above left: Mammatus clouds caused by vigorous down-drafts. From the hill above Pinden, Kent. Above right: Storm clouds brood across fields. Green Street Green, Kent. June 6, 2017.

Storms swept across our region on June 2, when it was warm and thundery. The temperature reached 26.8°C at Gravesend, Kent. The Met Office reported: "*Thundery downpours during the afternoon and evening of the 2nd across East Anglia, London and parts of SE England caused localised flooding, with some disruption to trains, roads, and at Stansted Airport.*"

Right: Cumulus clouds pile high over the River Thames in central London during the afternoon of June 6. On the evening of June 6, looking back towards London from a vantage point near Darenth, Kent, a huge mass of cloud smothered the sky toward London, where curtains of rain were falling.

Below right: This photo, taken on the evening of June 6, shows how storm damage in the field at Bean, Kent, had expanded since it was photographed on June 2. Below left: A rainbow over Kent on June 8.

Above left: Sunburst through clouds on the evening of June 9, seen from Darenth, Kent. Above right: A small tree beside Brooklands Lake at Dartford, Kent bends in a strong wind on June 10. Beneath the ruffled waters (left), a small northern pike (*Esox lucius*) lurks quietly for passing prey.

On June 10, masses of raspberries were ripening in the protected environment of poly-tunnels at Southfleet, Kent.

Below, left to right: A rose (*Rosa canina*) dangles from a hedgerow near West Kingsdown, Kent. A pyramidal orchid (*Anacamptis pyramidalis*) on the margin of a former coppice near Ash, Kent (June 18). The blue flowers of the green alkanet (*Pentaglottis sempervirens*). Vicinity of Ash farm, Kent (June 18). A gorse bush (*Ulex europeaus*) has passed flowering at Dartford Heath Kent (June 20).

Above: A hedgerow planted across the course of a dry valley at Ash, Kent. There are numerous dry valleys on the Chalk, a late Cretaceous limestone composed of the remains of microscopic marine algae. Today, water does not flow down these watercourses, because this bedrock is porous, but they could have formed when the ground was frozen hard into permafrost during the ice ages.

Left: Watering crops on June 22. Blue sky with cirrus clouds. June 26. Below: Fallen tree limb after stormy weather. June 28, 2017.

Monthly means for SE and central S England. Max. temp.: 21.8°C (2.2°C); min. temp.: 12.0°C (1.9°C). Hours of sunshine: 244.4 (121%). Rain: 58.2 mm (114%). Anomalies re. 1981-2010 norm in brackets. Regional data in this account are obtained from Met Office on-line monthly reports. Heathrow data from WeatherOnline.

A swathe of stinging nettles (*Urtica dioica*) between a playing field and a country road plays host to the nursery webs of the spider *Pisuara mirabilis*. The females stand guard over eggs and then the hatched spiderlings during the early stages of their development. This is a fairly damp environment, of the sort favoured by this spider. June. 25, 2017. New Ash Green, Kent, UK.

In its round up of weather impacts during June 2017, the UK's Met Office noted that heat had caused disruption to more than 90 trains in Norfolk, Suffolk and Essex, and disabled the mechanism of a road bridge in Lowestoft in Suffolk. Melting of road surfaces was seen in Cambridgeshire and Norfolk. Thunderstorms spread and lightning damaged roofs in London and Kent (where there were also power cuts). There was regional disruption of train services by lightning strikes. On June 27, outbreaks of thundery weather were associated with flooding of roads in the SE (90.2mm of rain fell at Santon Downham in Norfolk), lightning strikes again caused widespread disruption to trains, with strong winds the next day having some impact on travel.

Fields of Kent. Late June.
Right, June 26; Left June 27.

A round-up of some of the butterflies of the family Nymphalidae spotted in June 2017 in SE London and NW Kent. Anticlockwise: From upper right. Peacock (*Aglais io*) on June 2, and caterpillar (June 25). Despite small dips in population, its range is expanding into various uncolonised areas of N. Scotland. It is already in the Shetlands and Orkneys. Caterpillars were found in the strip of stinging nettles along field margin near New Ash Green where the spider *Pisura mirabilis* (previous page) was noted. The Red Admiral (*Vanessa atalanta*), seen here settled on a car near Sydenham Hill Wood, South London (June 10) is represented by a few individuals who over-winter, particularly in southern England), but most are May-June migrants from Central Europe. The Small Tortoiseshell (June 23) was abundant around Ash, Kent despite widespread losses due to the parastic fly *Sturmia bella*. Speckled Wood (*Pararge aegeria*), whose numbers are increasing as less coppicing encourages its shadier habitat. June 2. Beside hedgerow, Ash, Kent. Meadow Brown (*Maniola-jurtina*). Common, widely distributed and not of conservation concern. Field margin, Ash, Kent. June 18.

Global climate: The third warmest June in a 138 year record.

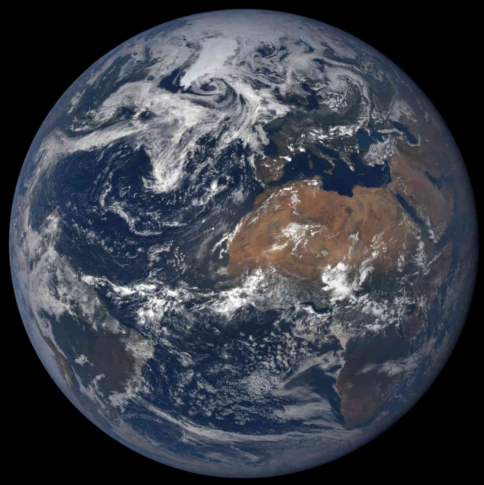
June 2017 was not a record-breaker, but it was yet another month whose warmth placed it near the top of the historical record, underlining the long-term upward trend in the world's temperature. According to the USA's National Oceanic and Atmospheric Administration, the mean global temperature was 0.82ºC higher than the 20th Century mean of 15.5ºC for June. The anomalies for 2015 and 2016 were 0.89ºC and 0.92ºC respectively. All the anomalies quoted below are positive.

Globally, land plus oceans were 0.82 ± 0.14ºC above the mean, oceans were 0.70 ± 0.14ºC above the mean and land areas (1.15 ± 0.13ºC), in each case, the 3rd warmest on record after 2016.

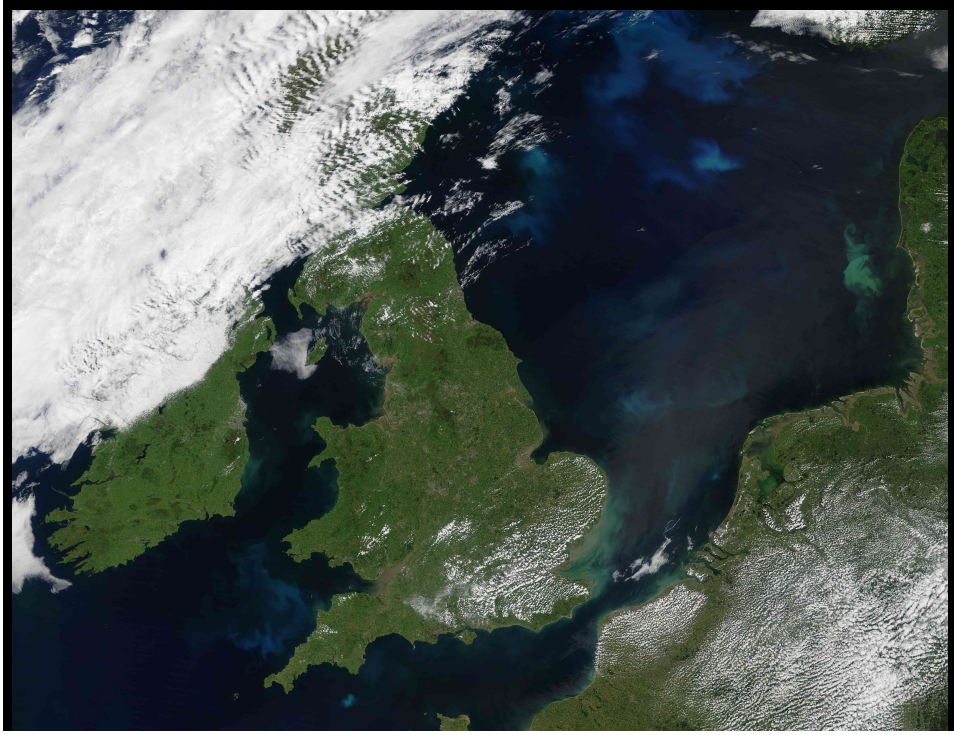
In the Northern Hemisphere, the combined mean temperature for land and ocean was 0.94 ± 0.15ºC above the mean, the 3rd highest on record with 2016 as warmest. The oceans were 0.80 ± 0.14ºC above the norm (4th warmest, with 2016 as warmest), while the land (1.19 ± 0.13ºC) above the mean, was its 5th warmest (2012 was warmest).

In the S. Hemisphere, the mean combined land and ocean temperature was 0.70 ± 0.14ºC above the mean (3rd warmest after 2015). The oceans were 0.64 ± 0.15ºC (2nd warmest after 2016) and the land was 1.05 ± 0.16ºC above the norm (5th warmest after 2015).

Source: *NOAA National Climatic Data Center, State of the Climate: Global Analysis for June 2017.* Published online. Data is provisional.



Above right: Planet Earth on the day of the summer solstice 2017. Image acquired at June 21, at 13:32:45 GMT. DSCOVR mission. NASA/NOAA. This was the day of the year when the northern hemisphere was tilted furthest towards the Sun. We can see far over Greenland and the Arctic Ocean.



Left: The southern British Isles enjoyed a sunny day on June 18, 2017, shortly before the the date of the summer solstice. South East England and large parts of northern France were dappled with cumulus clouds.

This image, obtained with the Moderate Resolution Imaging Spectro-radiometer (MODIS) aboard NASA's Terra satellite, revealed blooms of phytoplankton (turquoise) in the North Sea and Celtic Sea.

Above: The view from the ground in SE England on the same day (June 18) that MODIS took the image on the previous page. Ash, Kent. Upper left: June 21 was not only the date of the summer solstice, but also the hottest day of June, with the highest temperatures being recorded in the SE. A mini-mirage created by heating of a road surface in NW Kent gives the impression of water having been spilled across the tarmac. Sun set on the day of the solstice. Lower left: A gibbous Moon rides among the clouds near sunset on June 6.

Prime Meridian

This newsletter is published by the Ecospheres Project, a trans-Atlantic research and media collaboration. Prime Meridian follows global environmental issues alongside the cycle of the seasons in South East England. It steps back to look at the Earth in its astronomical context and it pursues the search for other habitable worlds.

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