

# Prime Meridian

(98) December 22, 2018

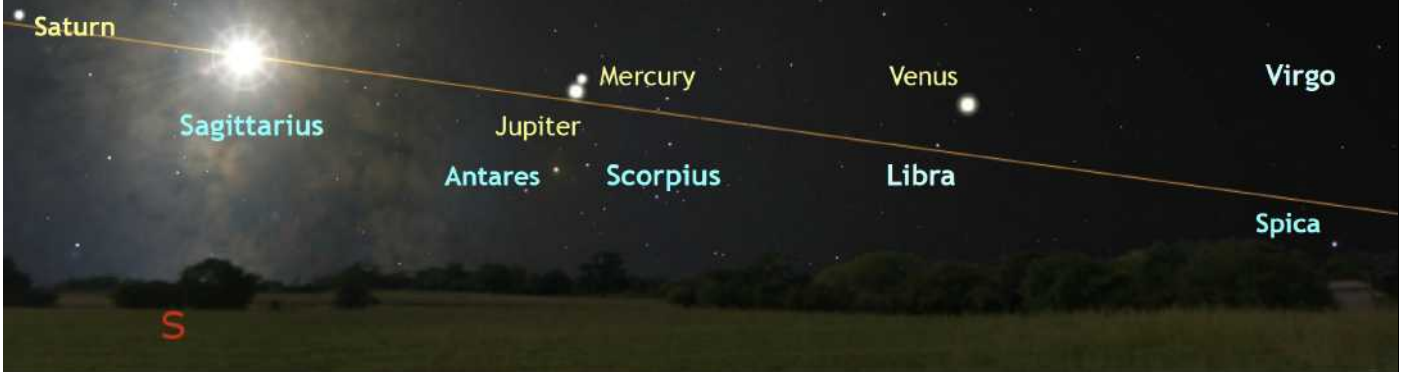
On December 21, 2018, the Northern Hemisphere passed through its Winter Solstice. As we are heading for Christmas Day and New Year, we have already emerged from the longest night and the length of daylight is increasing.

In this issue also, we look back on the end of summer and the onset of autumn in South East England.

With best wishes to all PM readers at this season; Editor, Martin Heath.

The morning Sun appearing from clouds at New Ash Green Kent. December 21, 2018.

## Winter Solstice 2018

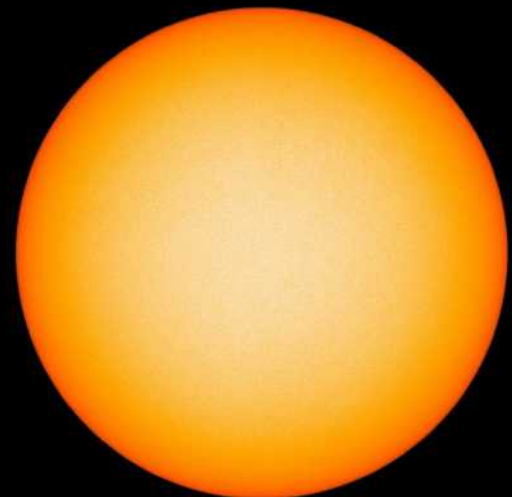


The Earth passed through the Solstice on December 21, the precise timing was at 22:23 GMT in the evening. The diagram, re-labelled from *Stellarium*, shows the sky around noon, as could be seen with the atmosphere removed. Four major planets would have been present; Mercury and Venus, which are inside the Earth's orbit, and the two gas giants of the outer Solar System, Jupiter and Saturn. At this time of year, the Sun, as seen from the Earth is located in the constellation of Sagittarius, which contains the centre of the Milky Way Galaxy.

Left: After rains during the night of December 21, the Sun emerged during the morning and afternoon, with intense gusts of wind. The picture at top was around noon at Ash, Kent.

In the Southern Hemisphere, it was the Summer Solstice. It was a clear day at the Amundsen-Scott South Pole Station at 13:35:02 (NOAA and NSF webcam).

Below: A spotless Sun was provided by NASA's Solar Dynamics Observatory at 00:45:00 GMT.

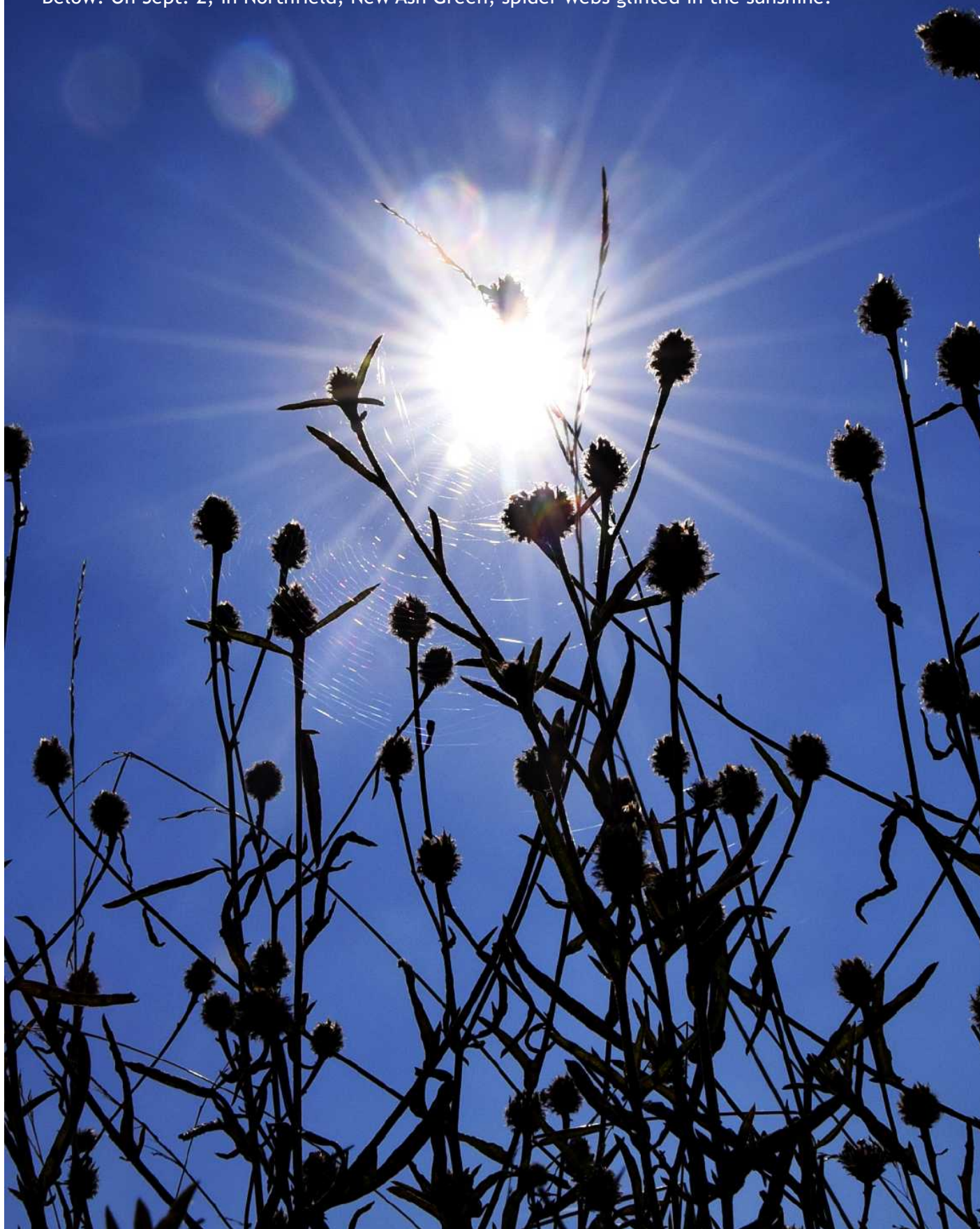




Seasons in South East England  
**September 2018**

**The Northern Hemisphere passed into Autumn on September 23.**

Below: On Sept. 2, in Northfield, New Ash Green, spider webs glinted in the sunshine.







Above: On the second day of September, the wheat had almost ripened in a field at Hartley, Kent and the leaves of the hawthorns (*Crataegus monogyna*) and elder (*Sambuca nigra*) in the hedgerows were still green. Left: On Sept. 1, purple loosestrife (*Lythrum salicaria*), a plant of damp conditions, was flowering in the wetter areas around the lake at Belair Park, in South London. As far as meteorologists are concerned the first day of September is their first day of Autumn, not the day of the astronomers Autumnal Equinox.

**This was a cooler, yet sunnier and drier September in our region.**

With a mean temperature of 12.4°C, the UK, as a whole, was rather cool (-0.2°C), compared with the 1981-2010 norm. England sat on the norm at 13.7°C (0.0°C), but its region of East Anglia was the warmest in the UK at 14.6°C, which was 0.1°C about its local norm. Meanwhile, the Met Office's region England SE & Central S, was cool than usual, at 14.3°C -0.1°C.

September 17 experienced the UK's warmest warmest day of the month, namely 26.5°C at the Cambridge Botanic Gardens. This was also the warmest day at Heathrow, Greater London, but not as high as 26°C.





## The Moon, stars and ancient life?

Above: The nights were becoming chillier, and in the early hours of Sept. 3, mist in Northfield at New Ash Green (Kent) was lit by Moonlight. The Moon was waning and had passed just beyond half (third quarter). To the left of the Moon, is the bright bluish star Elnath (Beta Tauri).

At the top right, a *Stellarium* picture avoids the brightness of the Moon and shows its appearance on that night. A faint star (HD 29038) had not long emerged from behind the Moon, as our natural satellite swept by in its orbit. The Moon passed above the bright star Aldebaran (Alpha Tauri) which is 65 light years distant. This star contains a fascinating surprise. It is around 1.06 times more massive than the Sun, and it has evolved into an orangey giant over 44 times wider, and 518 times for luminous. In 2015, a paper argued that not only did it have a planet, but this planet's orbit may have, in past ages, existed in the Habitable Zone, before the star became brighter. It's a giant world nearly 6 times more massive than the Sun's largest planet Jupiter - but it might have moons and life could have been possible. Farr, W. M; et al. (2018). [arXiv:1802.09812](https://arxiv.org/abs/1802.09812) [astro-ph.SR]. Piau, L. et al. (2011). [arXiv.org](https://arxiv.org/abs/1010.3649) > [astro-ph](https://arxiv.org/abs/1010.3649) > [arXiv:1010.3649](https://arxiv.org/abs/1010.3649). As scientists exploring the possibilities of life bearing planets our editors will not be able to resist giving our opinions in another issue!

## Back down to Earth.

A speckled wood butterfly (*Pararge aegeria*) was sunning itself on a path. Northfield at New Ash Green, Kent on Sept. 8. On the same day, harvesting was underway in a wheat field on a hill near Hartley, Kent. A wood pigeon (*Columba palumbus*) investigated the field, gleaning seeds and grain lost by the harvest.







The coldest day at Heathrow was Sept. 25 and approached around 3°C. However, the UK's minimum temperature lay for outside our region. This was a chilly -3.6°C at Katesbridge (Down, Northern Ireland) on Sept. 29.

The SE was spared from Storm Ali on September 19, which reached as far as North East England and Storm Bronagh on September 20 and 21 which crossed NE and E England. For September 21, the Met Office noted "blustery showers," with a 125.5 km per hour gust at the Needles on the Isle of Wight. At Heathrow, the wettest days were Sept. 20 and 21, (4 mm). Sept. 22 (7 mm) and Sept. 23 (13 mm).

SE and central S England, mean max. temp.: 19.3°C (0.4°C); mean min. temp.: 9.4°C (-0.6°C). Hours of sunshine: 188.2 (126%). Rain: 40.1 mm (64%). Anomalies re. 1981-2010 norm in brackets. Source UK Met Office. Data in this article have been derived from online publications by the UK Met Office and WeatherOnline.

<https://www.metoffice.gov.uk/climate/uk/summaries/2018/september>

<https://www.metoffice.gov.uk/climate/uk/summaries/2018/september/regional-values>

Left: Harvest-time in the fields near Hartley, Kent. Sept. 8, 2018. Hawthorns (*Crataegus monogyna*) in a hedgerow in Green Street Green, Kent. Sept. 17, 2018. Below: Sept. 13, 2018.







### The final days of September 2018.

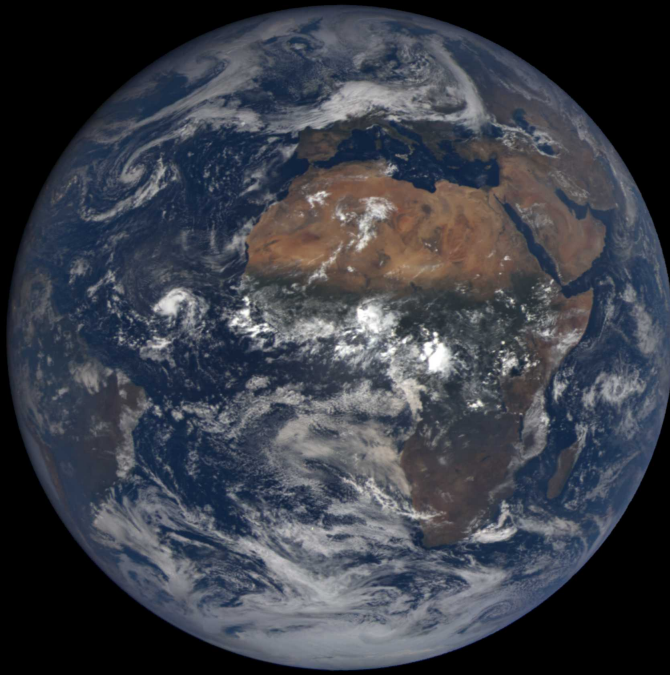
Above: A puddled lane between the fields at Ash, Kent on Sept. 21, 2018. The Sun glares through the trees in a woodland near West Kingsdown, Kent on Sept. 23 (the day of the Northern Hemisphere's Autumn Equinox). The Full Moon arrived in the early morning (approaching 3 pm GMT) of Sept. 25. The photo taken here was in the late evening of Sept. 24, which was very close to Full.

Left: An early appearance of the quintessential toadstool *Amanita muscaria* - fly agaric - was found in the woods at Hartley Bottom, Kent, on Sept. 28.

Below: The Sun was setting from the bridge at Crayford Station, Kent on Sept. 27. It was close to the Equinox, and although the days and nights were almost the same length, the nights were now beginning to draw in.







Global climate: 2018 and 2017 tied as the 4<sup>th</sup> hottest September in the 139-year record.

The National Oceanic and Atmospheric Administration (USA) stated: "With global records dating back to 1880, the September 2018 global temperature across the world's land and ocean surfaces was  $0.78^{\circ}\text{C}$  . . . above the 20th century average of  $15.0^{\circ}\text{C}$  . . . tying with 2017 as the fourth highest September temperature in the 139-year record. The ten warmest September global land and ocean surface temperatures have occurred since 2003, with the last five years (2014-2018) comprising the five warmest Septembers on record. September 2015 is the record warmest September at  $+0.93^{\circ}\text{C}$ ." The record began in 1880.

Source: NOAA National Climatic Data Center, *State of the Climate: Global Analysis for September, 2018*. Published online. Data is provisional. All the anomalies quoted are positive.

Readers can obtain further information from NOAA: <https://www.ncdc.noaa.gov/sotc/global/20189>

The image at above left was taken by the Deep Space Climate Observatory (NASA/NOAA) space craft on the day of the Autumn Equinox of the Northern Hemisphere. September 23, 2018. 11:24:52 GMT.

Below: Woods on the hill at Hartley, Kent were clearly underway into Autumn colours on Sept. 15, 2018.





Seasons in South East England  
**October 2018**

The trees were turning to their autumn colours, while fungi on the woodland floor. Insects and spiders set the scene for Halloween.

Below: Water droplets on webs in a misty day. Oct. 15, 2018. Ash, Kent.







**Warmer, sunnier and drier than normal, but colder temperatures were below the norm.**

The UK mean temperature was 9.6°C (0.1°C above the 1981-2010 long-term average). England's mean was 10.6°C (0.2°C) and England SE & Central S 11.3°C (0.2°C). The warmest of the Met Office's regions was East Anglia. It's mean was 11.6°C (0.6°C).

Neither the highest and lowest temperatures were observed in our region. In our region, a notable figure of 24.6°C was reported at Northholt in Greater London on Oct. 10, with Heathrow close behind. The UK's maximum temp. (Oct. 13) was reported at Donna Nook, in Lincolnshire (northern England) at 26.5°C. For our region, the Met Office said: "After an unseasonably warm night, with a minimum of 18.1 °C at Ringmer Bishops Lane (East Sussex), the 13th started off wet and windy for most". The UK's minimum temp. was reported St Harmon in Powys, Wales; -8.6°C on Oct. 30. Heathrow's coldest day was 0°C on Oct. 31.

The wettest days at Heathrow were Oct. 6 10 mm Oct 14. 30 mm. Oct. 15 6 mm. On Oct. 28 received "locally thundery with hail in the south-east". The Met Office stated: "For the UK as a whole this was the fifth sunniest October in a series from 1929, with 122% of average sunshine, and for East Anglia it was the joint sunniest October in the series (alongside 1959)."

Above and left: The first day of October, 2018. Woods and hedgerows at Ash, Kent. The red berries of hawthorn (*Crataegus monogyna*) remained resplendent adding to the autumnal colour of the trees (Green Street Green, Kent).





Traveller's joy (*Clematis vitalba*) and ivy (*Hedera helix*), were frequented by a Red Admiral (*Vanessa atalanta*). Ash, Kent on Oct. 5. A caterpillar of the moth Pale Tussock (*Calliteara pudibunda*) was crossing fallen leaves on a foot-path between fields and a small patch of trees at the same area on Ash, Kent on Oct. 7. On the morning of Oct. 7, the waning Moon, brilliant with Earth shine, during sunrise, lay close to the blue star Spica (Alpha Virginis), a double star system which lies 250 light years away. The Full Moon was taken on the evening of Oct. 24, 2018.







Mist covered the hills of Ash, Kent on Oct. 15, 2018. Oct. 20 enjoyed a clear blue sky. A hawthorn in the hedgerows around Hartley, Kent had lost its distinctive reddish berries. A tractor was at work, preparing the fields for the next task after the September harvest. On Oct. 21, the annual display of the fly agaric (*Amanita muscaria*) was well underway in Beacon Wood, Bean, Kent.

Monthly means for SE and central S England. Max. temp.: 15.7°C (0.8°C); min. temp.: 6.9°C (-0.5°C). Hours of sunshine: 147.1 (130%). Rain: 55.2 mm (59%). Anomalies re. 1981-2010 norm in brackets. Data obtained from Met Office on-line monthly reports. Heathrow data is obtained from WeatherOnline.

<https://www.metoffice.gov.uk/climate/uk/summaries/2018/october/regional-values>

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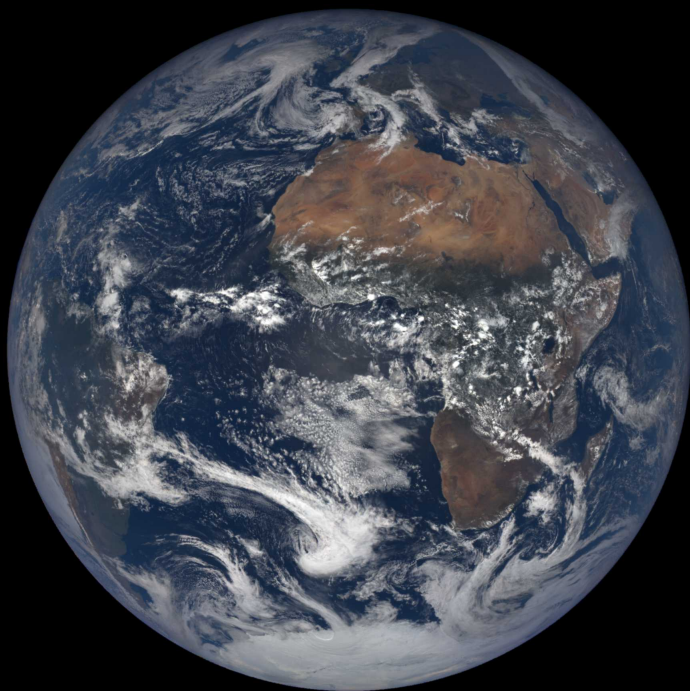


Top: A distant fall of rain in the afternoon of Oct. 28. Kent. Ripe apples near Hartley, Kent on Oct. 27. Frosty conditions were caught by P. Stanford on a car in New Ash Green, Kent on Oct. 29. The month ended with Halloween. Actually in the early morning of Oct. 31, a tinsel kitten with a festive hat sits out under the half Moon.



## Global climate: 2018 was the second warmest October in the 139-year record.

The National Oceanic and Atmospheric Administration (USA) stated: "The globally-averaged land-only surface temperature during October 2018 was 1.24°C . . . above the 20th century average and was also the second highest October in the 139-year record, trailing behind 2015 by 0.10°C . . . . The global oceans temperature tied with 2016 as the second highest October temperature since global records began in 1880 at 0.72°C . . . above average. This value is 0.15°C . . . less than the record set in 2015."



Source: NOAA National Climatic Data Center, *State of the Climate: Global Analysis for October 2018*. Published online. Data is provisional. All the anomalies quoted are positive. Readers can obtain further information from NOAA: <https://www.ncdc.noaa.gov/sotc/global/201810>

The image at above right was taken by the Deep Space Climate Observatory (NASA/NOAA) space craft in the middle of the month at October 15, 2018. 12:05:25 GMT.

## Prime Meridian.

Prime Meridian is published by the Ecospheres Project, a research and media collaboration.

This newsletter 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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