

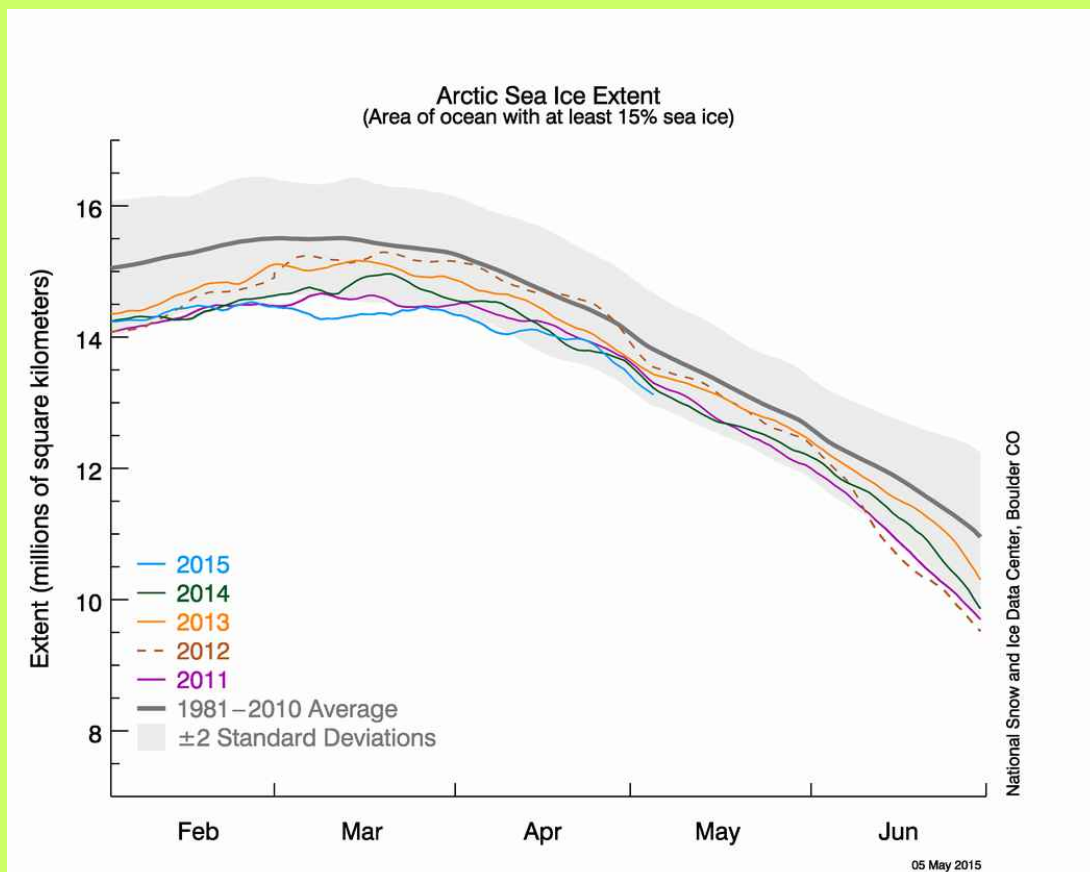
Prime Meridian

(40) May 25, 2015

A newsletter following global environmental issues alongside the cycle of the seasons in Southern England

Could Arctic sea ice be headed for a record low this summer?

May 2015 saw woods, fields and hedgerows returning to life in the countryside in SE England (May 9, above), whilst the news from the USA's National Snow and Ice Data Center was that the extent of floating sea ice in the Arctic had remained notably low. There are concerns that a regular near-disappearance in summer could be associated with significant changes in climate.



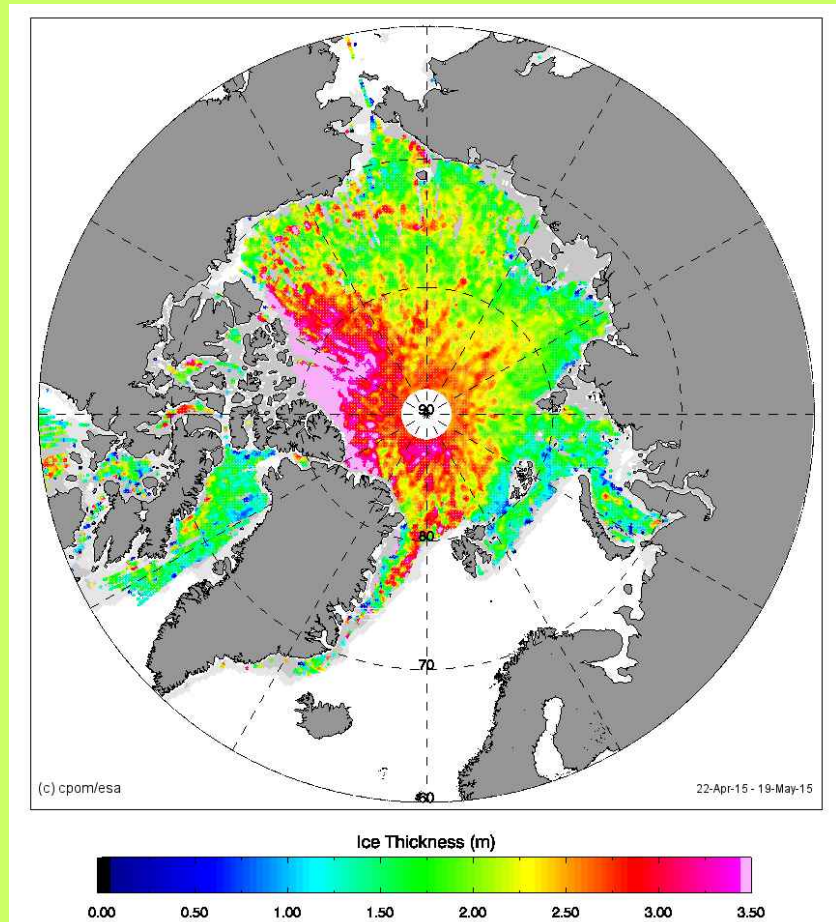
Winter sees a build of Arctic sea ice and this this year saw the floating ice cap manage its smallest maximum extent on record (February 25; 14.54 million km²), followed by another peak, 83,000 km² smaller, on March 26. The average for March (14.39 million km²) was the lowest in the satellite record. The average for April was 14.0 million km²), which was the second lowest in the record. With the extent of sea ice remaining notably low, a record minimum by the end of the summer is looking plausible.

The USA's National Snow and Ice Data Center noted that: *"Ice extent remained below average in the Barents Sea, the Sea of Okhotsk, and the Bering Sea. Sea ice was slightly more extensive than average off Newfoundland, in the Davis Strait, and in the Labrador Sea. The Labrador Sea is an important breeding area for harp and hooded seals in early spring. More extensive ice in this region favors more seal cubs being fully weaned before the ice breaks up, increasing their chance of survival."*

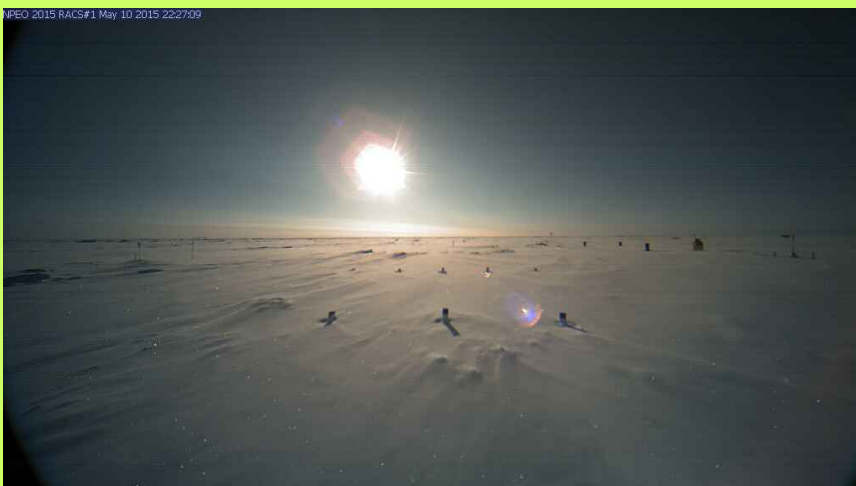
Sea ice thickness is a major factor in deciding how much of the floating ice cover will melt each summer. There have been major reductions in sea ice thickness over the period of observation.

The chart at right is from the Cryosat Operational Polar Monitoring website. Cryosat uses a radar system to probe ice thickness, and this is thwarted in the summer because melt ponds develop on the surface of the ice. The Cryosat website noted that: *"Although Arctic sea ice set a record this year for its lowest ever winter extent, it was on average 25 cm thicker than in 2013 when CryoSat recorded its lowest winter volume."*

Over the longer term, however, the trend is for ice loss. A study by R. Lindsay and A. Schweiger of the University of Washington, Seattle, USA, used measurements of ice thickness made by various methods and revealed that between 2000 to 2012 the annual mean average for the Arctic basin declined by 34 %, a trend of -0.58 ± 0.07 m per decade.

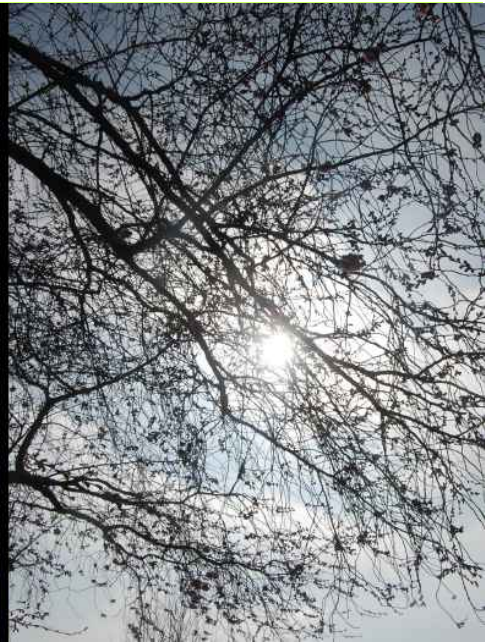
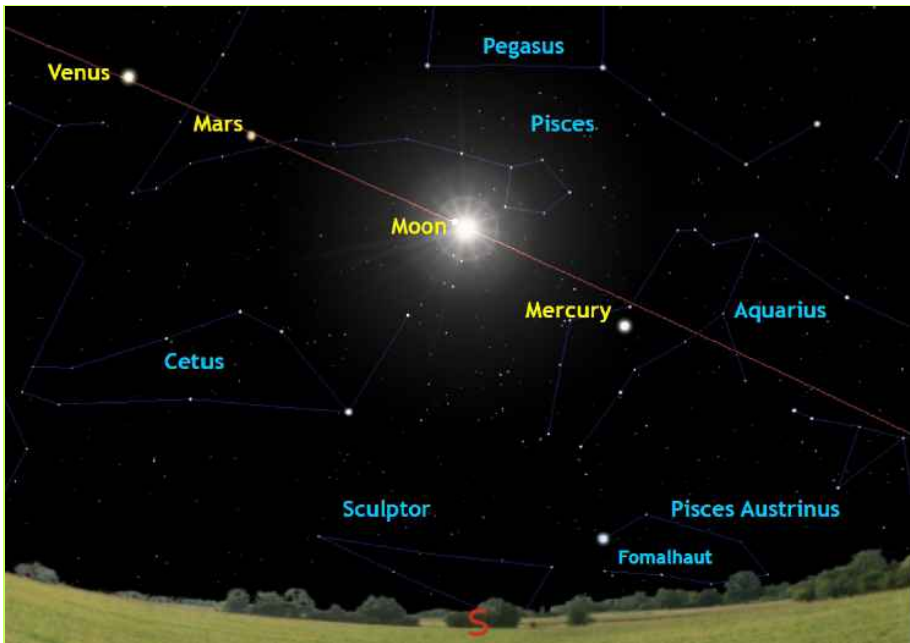


The September thickness (September is the month when the sea ice has melted away to its minimum extent) declined by half during this period.



For the period 1975 and 2012, ice thickness over the central part of the Arctic Ocean has decreased from an average of 3.59 m to 1.25 m (65% reduction). *"This is nearly double the 36% decline reported by an earlier study."* The mean ice thickness for September declined from 3.01 to 0.44 m, an 85% decline. Lindsay, R. & Schweiger, A. (2015). *The Cryosphere* 9: 269-283.

Left. The view from the sea ice in the high Arctic, May 10, 2015. Website of the North Pole Environmental Observatory.



Eclipse at the spring equinox.

Above: The Sun, Moon and planets on the date of the March 20, spring equinox (chart re-labelled after *Stellarium*). The equinox coincided with a total eclipse of the Sun. The photo left was taken by a member of our team, Penelope Stanford, who was aboard a ship at 64° 49' N, 06° 26' W. The track of totality took in the North Pole, which happens about every half a million years or so, and there, it saw the rising Sun covered.

Meanwhile, in London, the eclipse was partial, reaching 84%. The sky was, disappointingly, obscured by an unbroken overcast. However, the morning light grew decidedly gloomier at around maximum. The photo at right (M. J. Heath) shows vehicles driving with their headlights on along the South Circular in West Dulwich.



On March 20, the Sun set over the South Pole. The view below was taken by a webcam (USA's National Oceanic and Atmospheric Administration and National Science Foundation) on April 28, 2015, as the polar twilight gathered.



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Seasons in South East England March, 2015



Above: A hedgerow, bare except for ivy, catches the sunlight on March 6, 2015. A field near West Kingsdown, Kent.

Sunnier and drier than normal, but only very slightly warmer. The countryside comes to life.

The UK Met Office reported that: *"At the start of the month, the UK was in an unsettled Atlantic weather type bringing rain and strong wind at times. A succession of active depressions affected mainly northern and western areas from 5th to 12th, after which pressure built and the weather was more settled for most. The final week was rather unsettled with rain or showers generally and some very strong winds. It was generally driest in southern areas."*

Taking the month as a whole and considering the entire UK, the Met Office produced a provisional figure for the mean temperature of 5.5°C. This was 0.1° higher than the average (1981-2010) figure for March. This was despite the fact that the UK was sunnier than normal, enjoying 121% of its normal sunshine hours. The Met Office reported that rainfall for the UK was exactly 100% of the long-term mean. This was not the case in the SE, however, where rainfall was lower than normal and in some areas of central southern England, rainfall failed to reach half its normal value.

Right: Snow drops (*Galanthus*) flower along the wildlife walk in Belair Park, South London. A hedgerow beside St Peter's & St Paul's Church, at Ash, Kent is far from greening, but a carpet of snowdrops surrounds leaning tombstones in the churchyard. Weathering and ivy largely prevented their ages being read, but early 19th C dates were noted.





March 1 saw a max. temp. of around 12°C at Heathrow on the outskirts of London. March 5's min. temp. was below freezing, but March 6 saw over 13°C. On March 7, temperature reached its greatest value for the month, 16°C. On this same date, the UK's highest temperature for March of 17.4°C was recorded at Santon Downham in Suffolk.

Left: On the sunny afternoon of March 6, a primula hybrid was blooming beside the churchyard wall of St Peter's and St Paul's, Ash Kent. Left: Catkins of hazel (*Corylus avellana*) in a hedgerow near West Kingsdown, Kent.

A common frog (*Rana temporaria*). It was discovered in the chilly early hours of March 10, sitting in a torpid condition in the middle of a suburban road in the hills of West Norwood in South London. It was re-located to the wetland area of Belair Park, lower in the drainage basin of the former River Effra. Although relatively deep channels dissect parts of the landscape, the Effra has largely vanished from the suburban scene, with precipitation captured by storm drains.

Frogs generally emerge from hibernation in February and spawn in March, so these observations are in no way unusual. The earliest sighting of frogspawn was back on November 21, 2014 and it was reported by a National Trust ranger, Rachel Holder, on the North Predannack Downs nature reserve, which is located on the Lizard Peninsula, Cornwall (SW England). The earliest frogspawn on record was on October 26, 2005 (source: *The Guardian*). Early frogspawn faces the danger of being destroyed during cold snaps.



Above: Frogspawn deposited in a seasonal pond in Belair Park by Vinnie O'Connell. March 10, 2015. Right: Higher up the food chain. On March 11, Vinnie O'Connell snapped this photo of a grey heron (*Ardea cinerea*) in the wetland section of the Belair Park ecology area. The grey heron preys upon fish, ducklings, rodents and amphibians.



Above: Along a hedgerow planted to augment the ecological value of Belair Park, South London, leaves of hawthorn (*Crataegus monogyna*) open beside fruits remaining from last autumn. March 16, 2015.

March saw the greening of hedgerows get underway and ornamental trees in parks, gardens on the street come into bloom. The tree left, cherry at top, and magnolia at bottom, were photographed in West Norwood, South London on March 26.

The temperature around London did not achieve a similar high to that on March 7 during the rest of the month, although it exceeded 14°C on March 12 and again on March 28. Maximum temperatures rose after March 21 and minimum temperatures, which approached 0°C on March 25, rose thereafter.

On March 16, about 3 mm rain fell at Heathrow, followed by 2mm on March 23. March 26 was the rainiest day of the month at Heathrow, with 8 mm and 5 mm of rain was recorded on March 29. Sources: UK Met Office and WeatherOnline.

SE and central S England, mean max. temp.: 10.7°C (0.2°C); mean min. temp.: 3.1°C (0.1°C). Hours of sunshine: 142.2 (124%). Rain: 24.5 mm (43%). Anomalies re. 1981-2010 norm in brackets. Source UK Met Office.





Above: March 24, 2015. Service of tenebrae (shadows) held in the chapel, King's College London. More usually held on the Thursday, Good Friday or Saturday before Easter, it is an end of term event at KCL.



Left: "Sticky" buds of Horse Chestnut (*Aesculus hippocastanum*) opening during March. Buds in West Norwood on March 12 and in West Dulwich on March 29.

Global climate: The warmest March on record.

The USA's National Oceanic and Atmospheric Administration reported that taken together, the world's land and ocean had a mean temperature for March 2015 of $0.85 \pm 0.08^\circ\text{C}$ above the 20th Century mean of 12.7°C . since records began in 1880. Globally, land areas ($1.65 \pm 0.219^\circ\text{C}$ above the mean) the 2nd warmest March (the warmest was 2008), whilst the oceans ($0.55 \pm 0.04^\circ\text{C}$ above the norm) were their 3rd warmest on record (1998 and 2010 tied for warmest).

In the Northern Hemisphere, the combined mean temperature for land and ocean was $1.08 \pm 0.13^\circ\text{C}$ above the norm, the 3rd warmest on record 2008 was the highest. Land areas, at $1.89 \pm 0.31^\circ\text{C}$ above the norm, were the 3rd warmest on record (2008 was warmest), but the Northern Hemisphere's oceans were the warmest on record at $0.58 \pm 0.05^\circ\text{C}$ above the mean. It certainly was not a record breaking month in the Southern Hemisphere. Here, the combined land and ocean temperature ($0.61 \pm 0.09^\circ\text{C}$ above the norm) was the 3rd warmest on record (1998 was warmest). The Southern hemisphere's oceans (0.55 ± 0.05 above the norm) were the 4th warmest on record (warmest was 1998). It is remarkable that these figures all rate well within the top ten. Land areas for this hemisphere, however, were merely the 3rd warmest in the record ($1.1 \pm 0.17^\circ\text{C}$ above the norm, with 2010 as the warmest).

