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WHAT WE DO ► CLIMATE BULLETIN ► SURFACE AIR TEMPERATURE ►

SURFACE AIR TEMPERATURE FOR JULY 2019

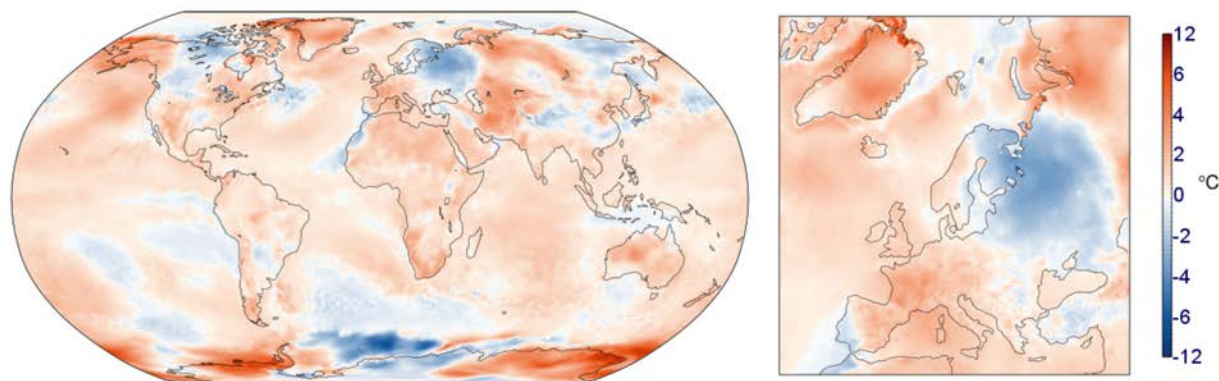
Surface air temperature for July 2019

In Europe July temperatures were just above to the 1981-2010 average, with large differences across the continent. Western Europe was above average, largely due to the short, but very intense heatwave in the last week of the month. The eastern parts of the continent were generally below average, particularly so in the north-east. Globally

temperatures were the most above the 1981-2010 average over Alaska, Baffin Island and Greenland, parts of Siberia, the central Asian Republics and Iran, as well as large parts of Antarctica. Africa and Australia were above average over almost all of each continent. Areas with temperatures below the 1981-2010 average include mid-western Canada and parts of Asia, and over the Weddell Sea and inland from there over Antarctica.



Surface air temperature anomaly for July 2019 relative to 1981-2010



Surface air temperature anomaly for July 2019 relative to the July average for the period 1981-2010. Data source: ERA5. (Credit: ECMWF, Copernicus Climate Change Service)

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The average temperature over Europe in July 2019 was just above the 1981-2010 average for the month. It was warmer than normal over western Europe, except for south-western Iberia, but cooler than normal over the east of the continent, particularly the north-east. The first half of the month had a wider area of below-normal temperature but a short, very intense heatwave towards the end of the month over western Europe raised averages there for the month as a whole. Several countrywide and capital-city records for maximum temperature were broken during the heatwave, as detailed in the information that has been collated and made available by the [World Meteorological Organization](#).

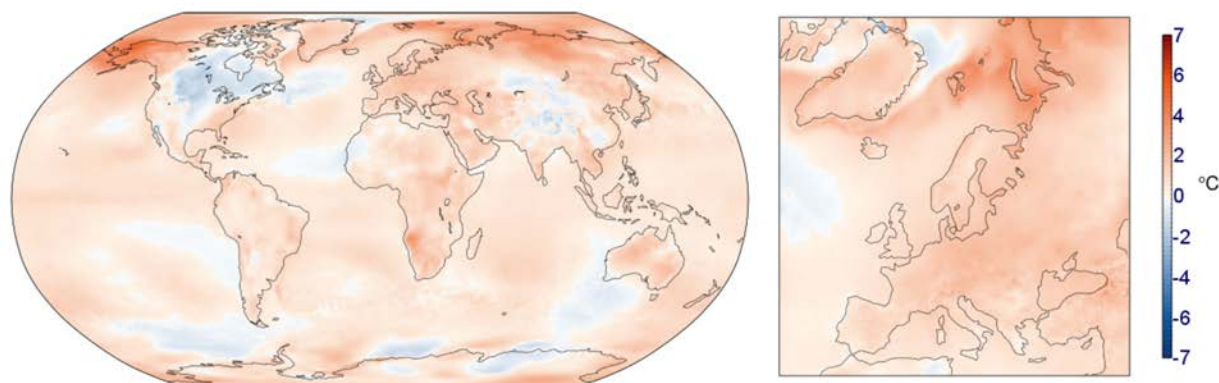
Elsewhere, temperatures were markedly above average over Alaska, where all-time [temperature records](#) were broken, over Baffin and Ellesmere Islands, where the record at the northernmost settlement [Alert](#) was broken, and most of Greenland, where monitoring indicated a high rate of [ice-sheet mass loss](#) due to melting. Much of Antarctica was less cold than usual for July. Other regions with temperatures substantially above normal include much of the USA and eastern Canada, Iran, the Central Asian Republics and a swathe of Siberia to the north, and most of Africa and Australia.

Following generally [warm](#) and [dry](#) conditions in June, a high level of [wildfire activity](#) has continued in eastern Russia and Alaska.

Temperatures were notably below average over mid-western Canada and parts of Asia, and over the Weddell Sea and inland from there over Antarctica. Other land regions tended to be moderately warmer than average, but some experienced conditions that were a little cooler than average.

Although regions of below-average temperature occurred over all major oceans, marine air temperatures were predominantly higher than average.

Surface air temperature anomaly for August 2018 to July 2019 relative to 1981-2010

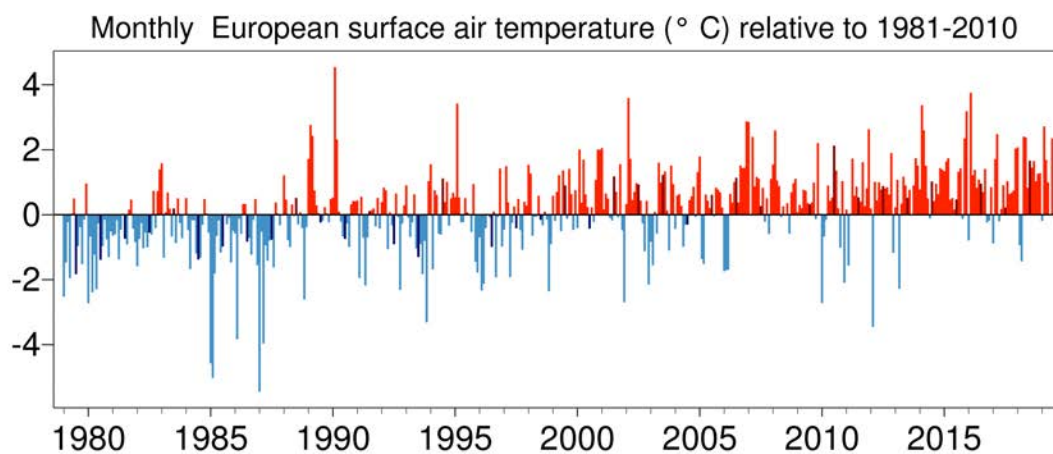
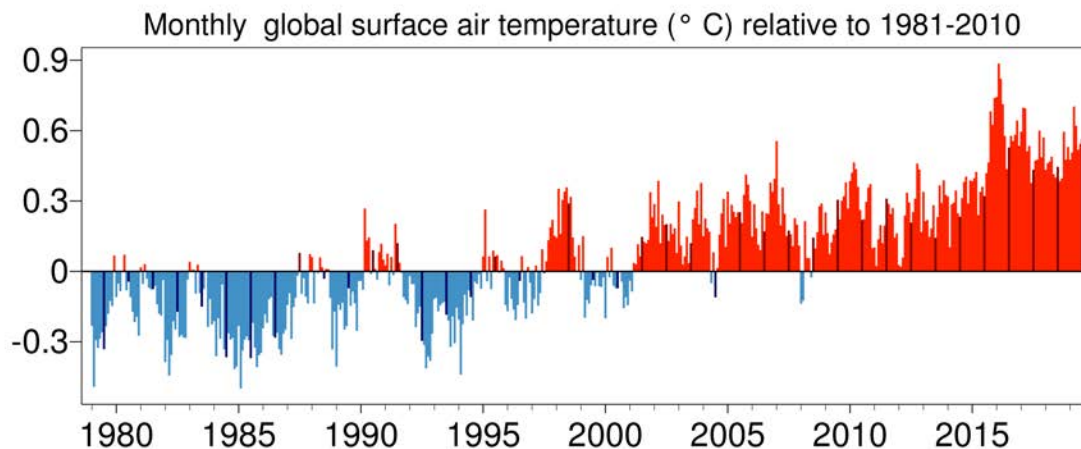


Surface air temperature anomaly for August 2018 to July 2019 relative to the average for 1981-2010. Data source: ERA5. (Credit: ECMWF, Copernicus Climate Change Service)

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Temperatures averaged over the twelve-month period from August 2018 to July 2019 were:

- much above the 1981-2010 average over most of the Arctic, peaking over and near Alaska;
- above average over almost all of Europe;
- above average over other areas of land and ocean, especially so over central northern Siberia, north-eastern China, the Middle East, south-east Asia, Australia, central and southern Africa and some parts of the Antarctic;
- below average over several land and oceanic areas, including much of Canada, parts of the North Atlantic and South Pacific, and to the south-west of Australia.



Monthly global-mean and European-mean surface air temperature anomalies relative to 1981-2010, from January 1979 to July 2019. The

darker coloured bars denote the July values. Data source: ERA5. (Credit: ECMWF, Copernicus Climate Change Service)

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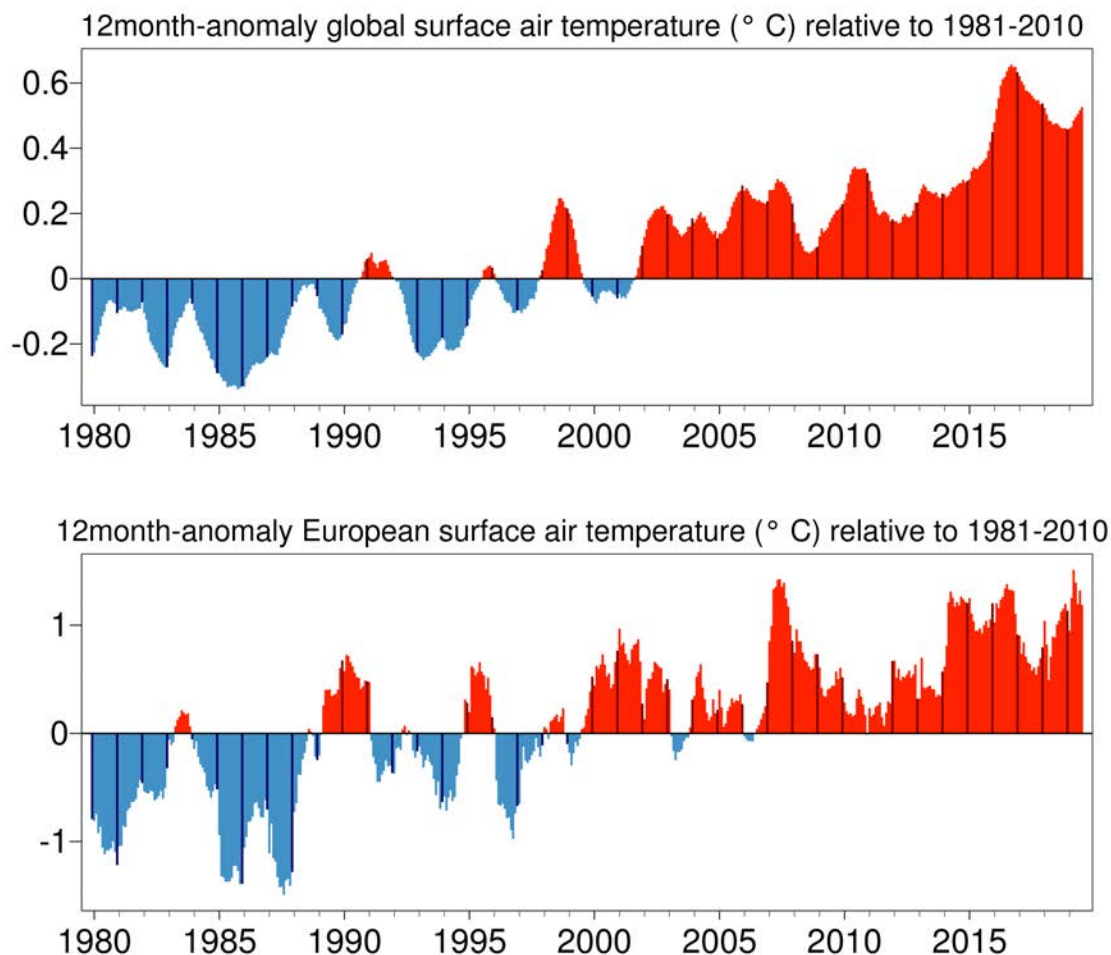
The global temperature was substantially above average in July 2019, sufficient for the month to become by a narrow margin the warmest July in this data record.

July 2019 was:

- 0.56°C warmer than the average July from 1981-2010;
- about 0.04°C warmer than July 2016, the previous warmest July in this data record.

July is typically the warmest month of the year in the global average. July 2016 was previously the warmest of any month on record in absolute terms. It has now been surpassed by July 2019, albeit by a margin that is small compared with the typical differences between datasets for previous Julys. Further discussion and illustrations can be found [here](#).

The largest anomalies in European-average temperatures occur in wintertime, when values can vary substantially from month to month. June 2019 was nevertheless substantially warmer than average, by more than 2.3°C. In contrast, July 2019 had a European-average temperature less than 0.1°C above the 1981-2010 norm.



Running twelve-month averages of global-mean and European-mean surface air temperature anomalies relative to 1981-2010, based on monthly values from January 1979 to July 2019. The darker coloured bars are the averages for each of the calendar years from 1979 to 2018. Data source: ERA5. (Credit: ECMWF, Copernicus Climate Change Service)

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Averaging over twelve-month periods smooths out the shorter-term variations. Globally, the twelve-month period from August 2018 to July 2019 was 0.53°C warmer than the 1981-2010 average. The warmest twelve-month period was from October 2015 to September 2016, with a temperature 0.66°C above average. 2016 is the warmest calendar year on record, with a global temperature 0.63°C above that for 1981-2010. The second warmest calendar year, 2017, had a temperature 0.54°C above average, while the third warmest year, 2018, was 0.46°C above the 1981-2010 average.

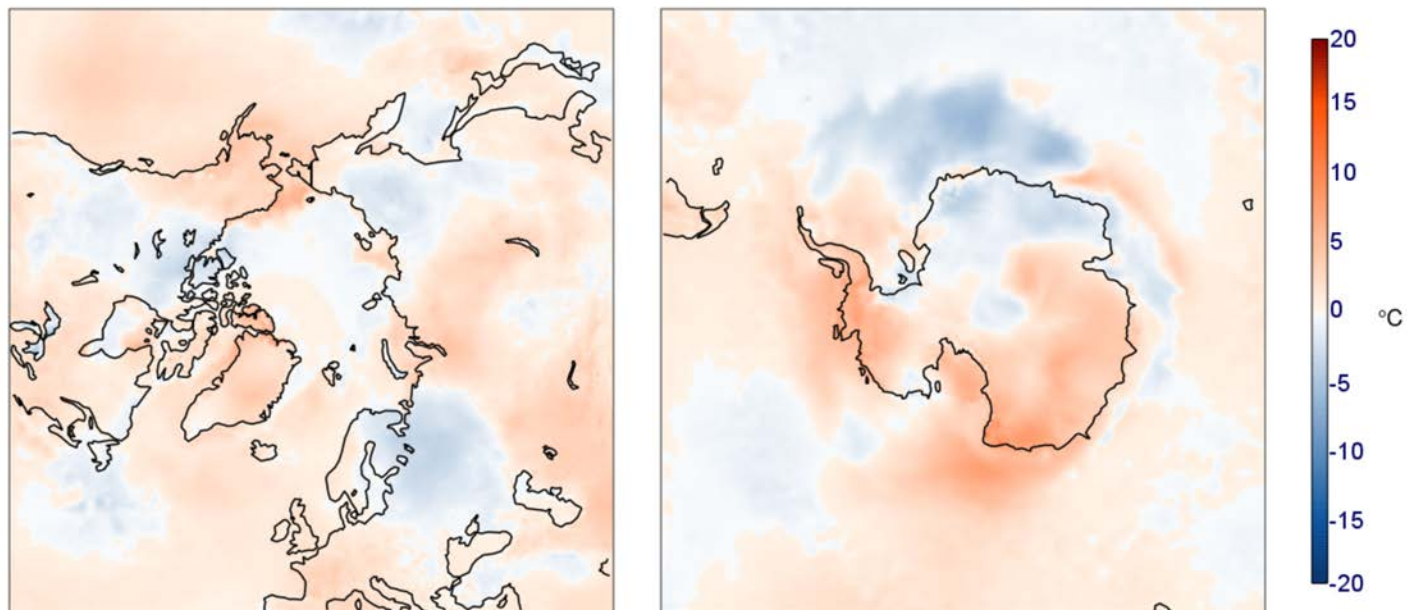
0.63°C should be added to these values to relate recent global temperatures to the pre-industrial level defined in the IPCC Special Report on “Global Warming of 1.5°C”. Monthly temperatures over the past twelve months have been mostly in the range from 1.0 to 1.1°C above this pre-industrial level. The temperature for July 2019 is close to 1.2°C above the level.

The spread in the global averages from various temperature datasets has been unusually large over the past two or more years. During this period the twelve-month average values presented here are higher than those from several independent datasets, by between 0.05°C and 0.15°C for the twelve months for which spread is largest. This is due partly to differences in the extent to which datasets represent the relatively warm conditions that have predominated over the Arctic and the seas around Antarctica. Differences in estimates both of sea-surface temperature elsewhere and of temperatures over land outside the Arctic have been further factors. There is nevertheless general agreement between datasets regarding:

- the exceptional warmth of 2016, and the warmth also of 2015, 2017 and 2018;
- the overall rate of warming since the late 1970s;
- the sustained period of above-average temperatures from 2001 onwards.

There is more variability in average European temperatures, but values are less uncertain because observational coverage of the continent is relatively dense. Twelve-month averages for Europe were at a high level from 2014 to 2016. They then fell, but remained 0.5°C or more above the 1981-2010 average. Twelve-month averages have risen since then. The latest average, for the period from August 2018 to July 2019, is close to 1.2°C above the 1981-2010 norm. The warmest such period, from April 2018 to March 2019, was 1.5°C above average.

[The average surface air temperature analysis homepage](#) explains more about the production and reliability of the values presented here.



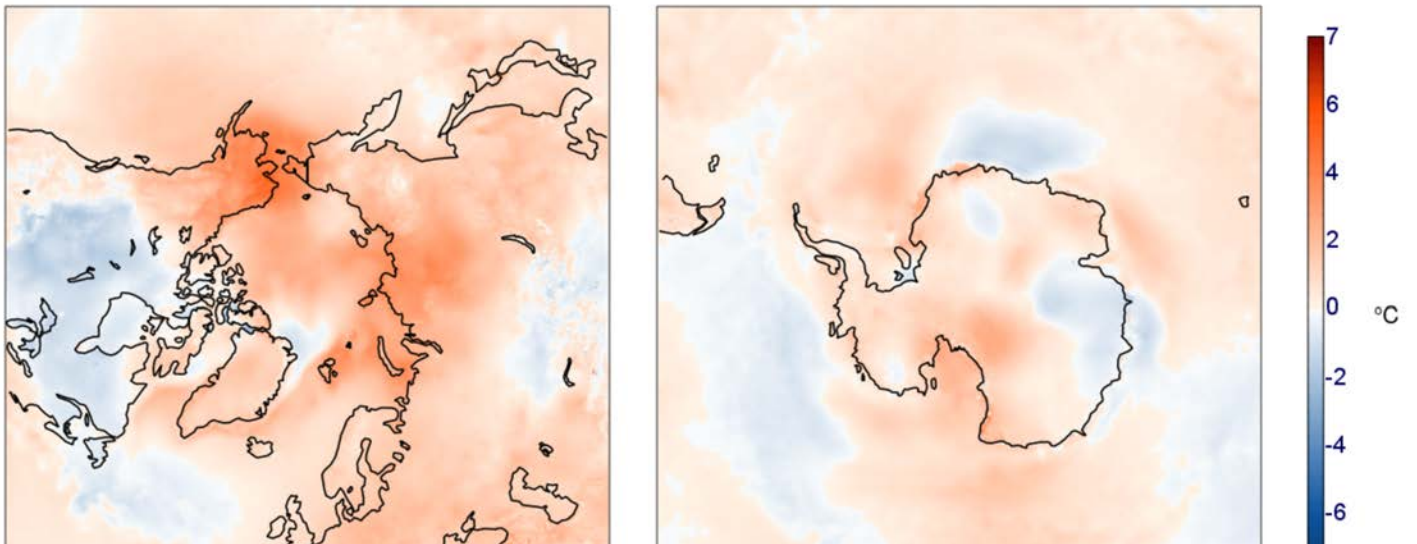
[SURFACE AIR TEMPERATURE MAPS OF PREVIOUS MONTHS](#)

YOU CAN FIND MORE INFORMATION ABOUT THE MAPS AND THE DATA ON OUR [SURFACE AIR TEMPERATURE ANALYSIS PAGE](#).

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Surface air temperature anomaly for August 2018 to July 2019 relative to 1981-2010





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