

Global temperature for 2019 to be the 2nd highest since 1891 (Preliminary)

The annual anomaly of the global average surface temperature for the year 2019 (i.e., the combined average of the near-surface air temperature over land and the sea surface temperature) is estimated at +0.42°C* above the 1981 – 2010 average, likely to be the second warmest on record. The past five years (2015 to 2019) are likely to be the five warmest years for the 129-year period since 1891 (Figure 1).

The monthly average air temperatures for June and July in 2019 were the highest recorded since 1891 and other months to November were ranked within the fourth warmest or higher for each month. The seasonal average air temperature for the boreal summer (June to August) were also the highest recorded since 1891 for the season.

On a longer time scale, the annual global average surface temperature has been rising at a rate of about 0.74°C per century, which is thought to be attributed to global warming due to increase in anthropogenic greenhouse gas concentrations including carbon dioxide. In addition the global averaged surface temperature is affected by inter-annual to decadal natural fluctuations intrinsic to the earth's climate. For this year, weak El Niño conditions seen until the spring 2019 may partly contribute to the high global temperatures.

Warm temperature deviations are especially seen over wide areas of Europe, East Asia and Australia over the land, and over the North Pacific and the Indian Ocean (Figure 2).

The final report on the global temperature for 2019 is scheduled to be published early in February 2020.

* Note that this figure (hence its rank in the record, either) is still subject to change, because at the moment of this announcement it is only a preliminary result that was calculated based on temperature observations for the period of January to November in 2019.

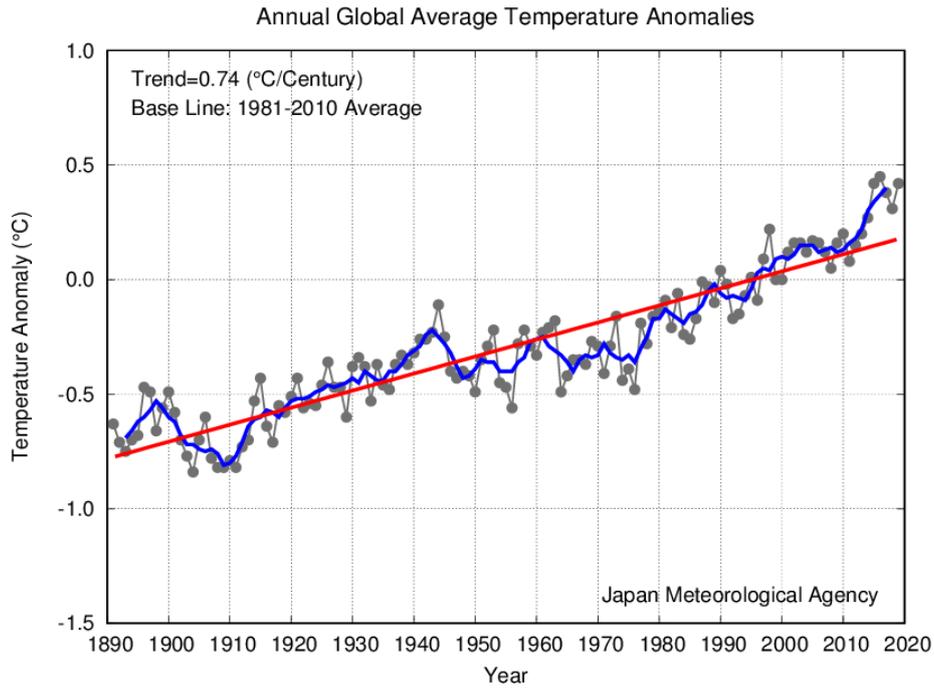


Figure 1 Long-term change in annual mean surface temperature anomalies over the globe
 The black line with filled circles indicates anomalies of surface temperature in each year. The blue line indicates five-year running mean, and the red line indicates a long-term linear trend. Anomalies are represented as deviations from the 1981 – 2010 average.

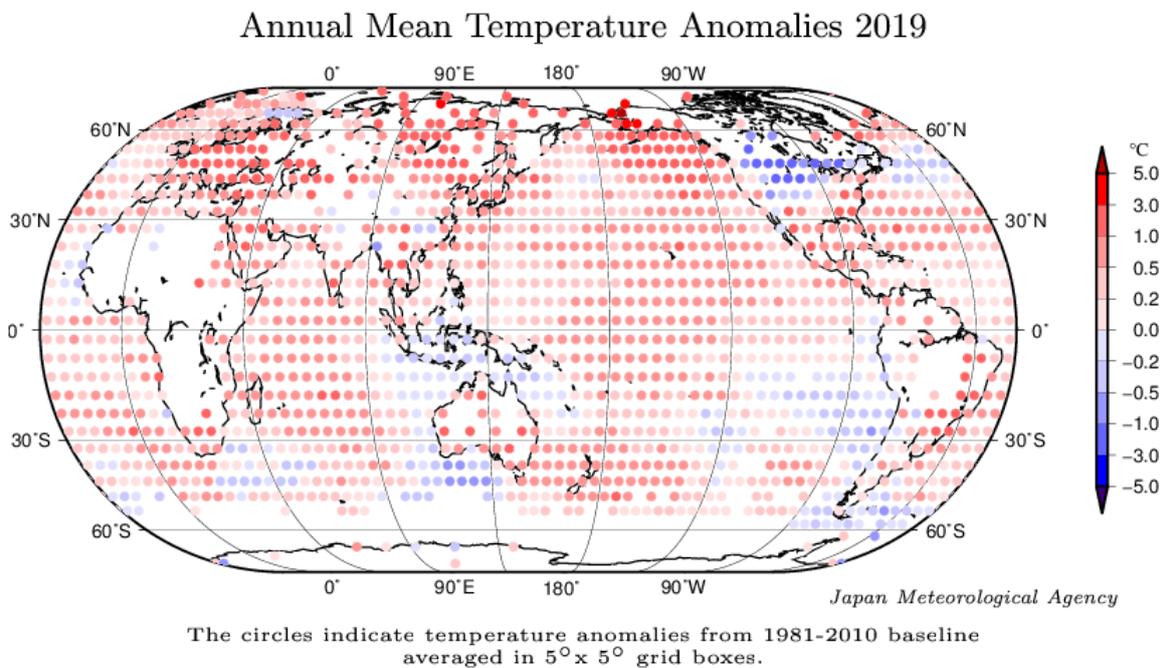


Figure 2 Annual mean temperature anomalies in 2019
 The circles indicate anomalies of surface temperature averaged in 5° x 5° grid boxes. Anomalies are deviations from the 1981 – 2010 average.

Ranking of annual global average temperatures

Rank	Year	Temperature Anomaly w.r.t. 1981 – 2010 average
1	2016	+0.45
2	2019	+0.42 (Preliminary value)
	2015	+0.42
4	2017	+0.38
5	2018	+0.31
6	2014	+0.27
7	1998	+0.22
8	2013	+0.20
	2010	+0.20
10	2005	+0.17