

## Global temperature for 2018 to be the 4<sup>th</sup> highest since 1891 (Preliminary)

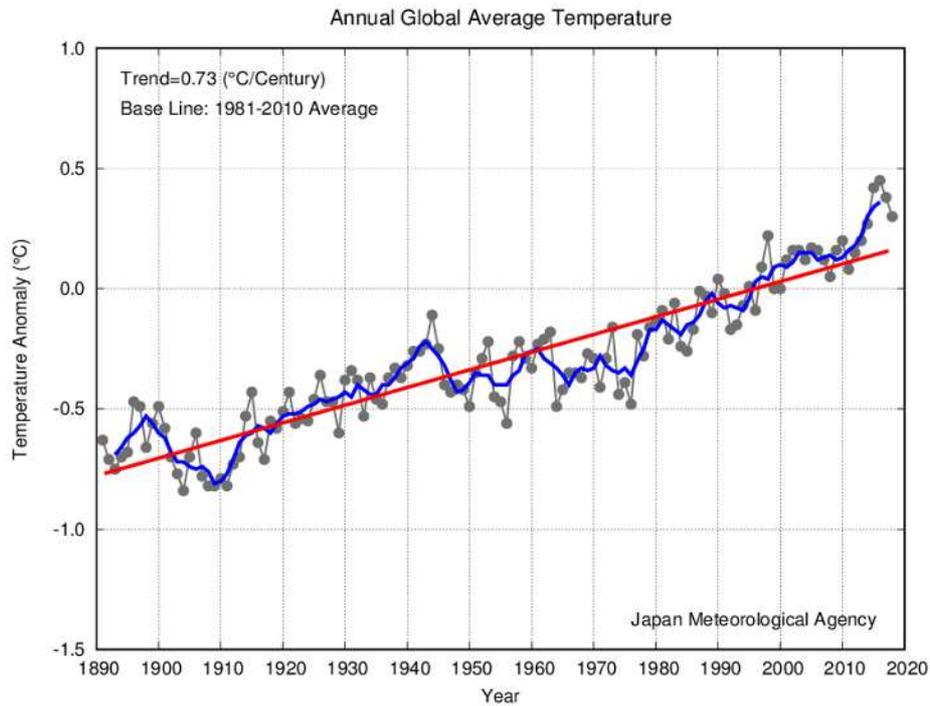
The annual anomaly of the global average surface temperature for the year 2018 (i.e., the combined average of the near-surface air temperature over land and the sea surface temperature) is estimated at +0.30°C\* above the 1981 – 2010 average, likely to be the fourth warmest on record. The past four years (2015, 2016, 2017 and 2018) are likely to be within top four years for the 128-year period since 1891 (Figure 1). It is known that the global mean surface temperature tends to decrease after a La Niña event occurs. Although the La Niña event occurred for the period from autumn 2017 to spring 2018, 2018 is likely to rank just below the previous three years – 2016 (the first warmest), 2015 (the second warmest) and 2017 (the third warmest) – .

On a longer time scale, the annual global average surface temperature has been rising at a rate of about 0.73°C per century, which is thought to be attributed to global warming due to increase in anthropogenic greenhouse gas concentrations including carbon dioxide. Moreover the global averaged surface temperature is affected by inter-annual to decadal natural fluctuations intrinsic to the earth's climate.

Warm temperature deviations are especially seen over wide areas of Europe, East Asia and southwestern USA (Figure 2).

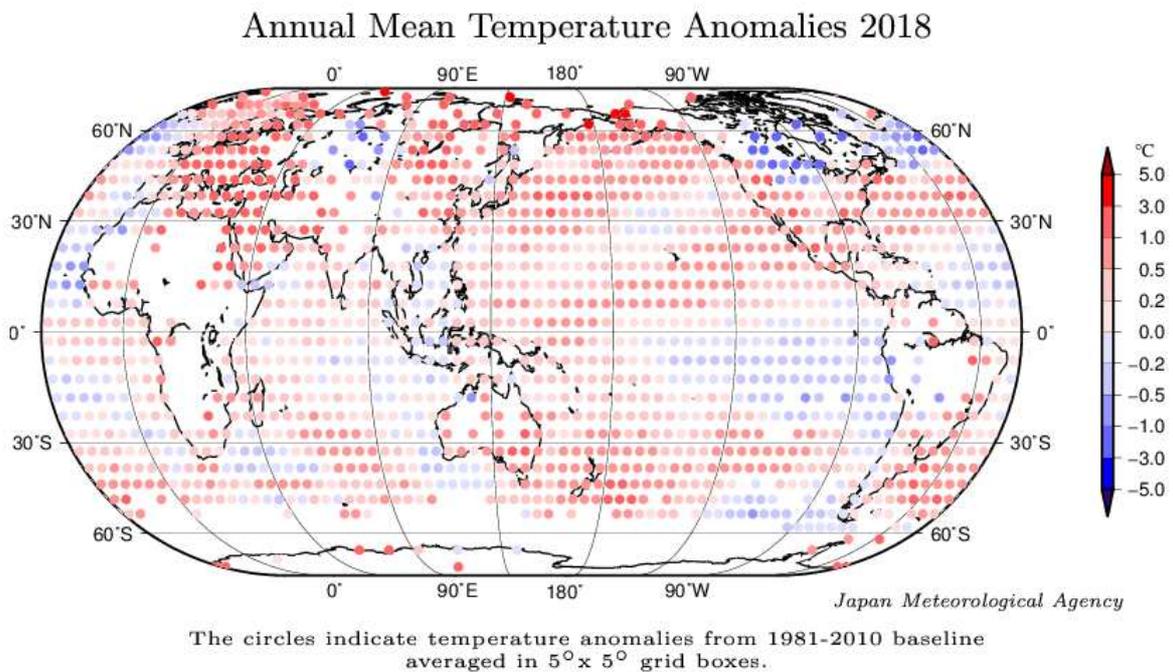
The final report on the global temperature for 2018 is scheduled to be published early in February 2019.

\* 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 2018.



**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 2018**

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	2015	+0.42
3	2017	+0.39
<b>4</b>	<b>2018</b>	<b>+0.30 (Preliminary value)</b>
5	2014	+0.27
6	1998	+0.22
7	2013	+0.20
	2010	+0.20
9	2005	+0.17
10	2009	+0.16
	2006	+0.16
	2003	+0.16
	2002	+0.16