22 December 2020
Tokyo Climate Center
Japan Meteorological Agency

Global temperature for 2020 to be the highest since 1891 (Preliminary)

The annual anomaly of the global average surface temperature for the year 2020 (i.e., the combined average of the near-surface air temperature over land and the sea surface temperature) is estimated at +0.47°C* above the 1981 – 2010 average, likely to be the warmest on record. The past seven years (2014 to 2020) are likely to be the seven warmest years for the 130-year period since 1891 (Figure 1).

The monthly average air temperatures for January and May in 2020 were the highest recorded since 1891 and other months to November were ranked within the fifth warmest or higher for each month. The seasonal average air temperature for the boreal winter (December to February) and spring (March to May) 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 0.75°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. It is known that the global mean surface temperature tends to decrease after a La Niña event occurs and vice versa. Although La Niña conditions are considered to have persisted from the summer 2020, the warmth of 2020 is likely to be comparable to or higher than that of 2016 associated with remarkably strong El Niño conditions.

Warm temperature deviations are especially seen over wide areas of Europe to 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 2020 is scheduled to be published early in February 2021.

* 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 2020.

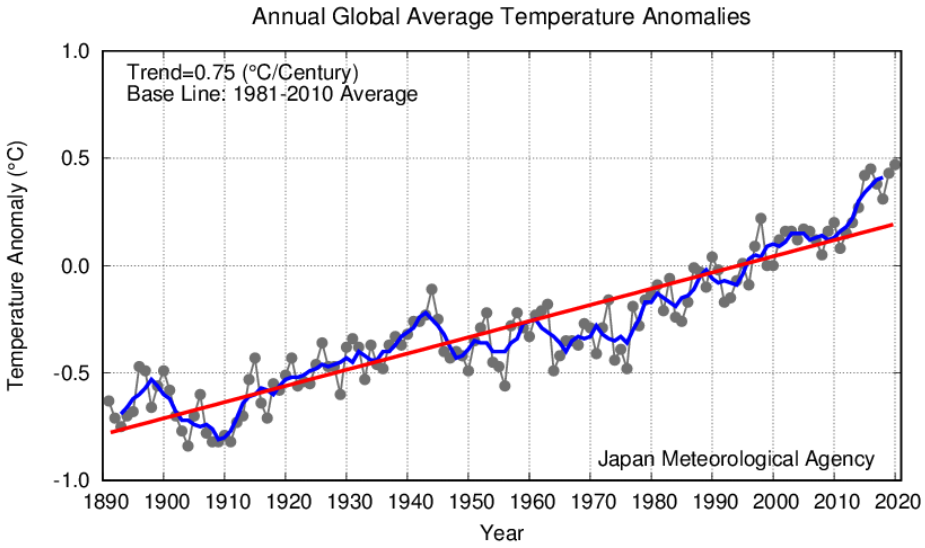

Figure 1 Long-term change in annual mean surface temperature anomalies over the globe (Preliminary value)

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.

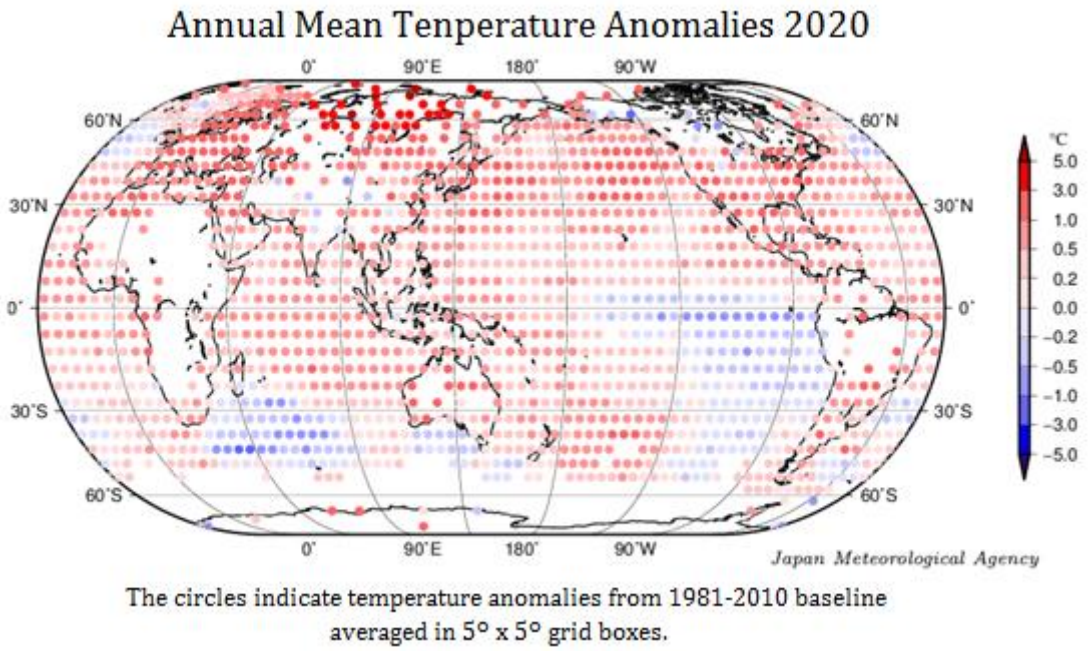

Figure 2 Annual mean temperature anomalies in 2020 (Preliminary value)

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	**2020**	**+0.47 (Preliminary value)**
2	2016	+0.45
3	2019	+0.43
4	2015	+0.42
5	2017	+0.38
6	2018	+0.31
7	2014	+0.27
8	1998	+0.22
9	2013	+0.20
	2010	+0.20