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Japan Meteorological Agency

Global temperature for 2013 ranked 2nd on record

The annual anomaly of the global average surface temperature for the year 2013 (i.e. the combined average of the near-surface air temperature over land and the sea surface temperature) is estimated at +0.20°C above the 1981-2010 average, ranked as the second warmest record for the 123-year period since 1891 (Figure 1).

The monthly average air temperatures for September and November 2013 and the boreal autumn average temperature (i.e. for the three months of September to November) were record highest since 1891.

Warm temperature deviations are widely seen across much of Eurasia, Australia, and the central North Pacific. Meanwhile the equatorial Pacific experienced cooler than normal conditions (Figure 2).

On a longer time scale, the annual global average surface temperature has been rising at a rate of about 0.69°C per century.

The average temperature over land alone is +0.34°C above the 1981-2010 average, which is the fourth warmest record since 1891.

Each of the 13 years in this century ranks in the warmest 15 years since 1891. The recent high temperatures are thought to be explained by the combined effect of the global warming trend due to increase in anthropogenic greenhouse gas concentrations including carbon dioxide, and decadal natural fluctuations intrinsic to the earth’s climate.

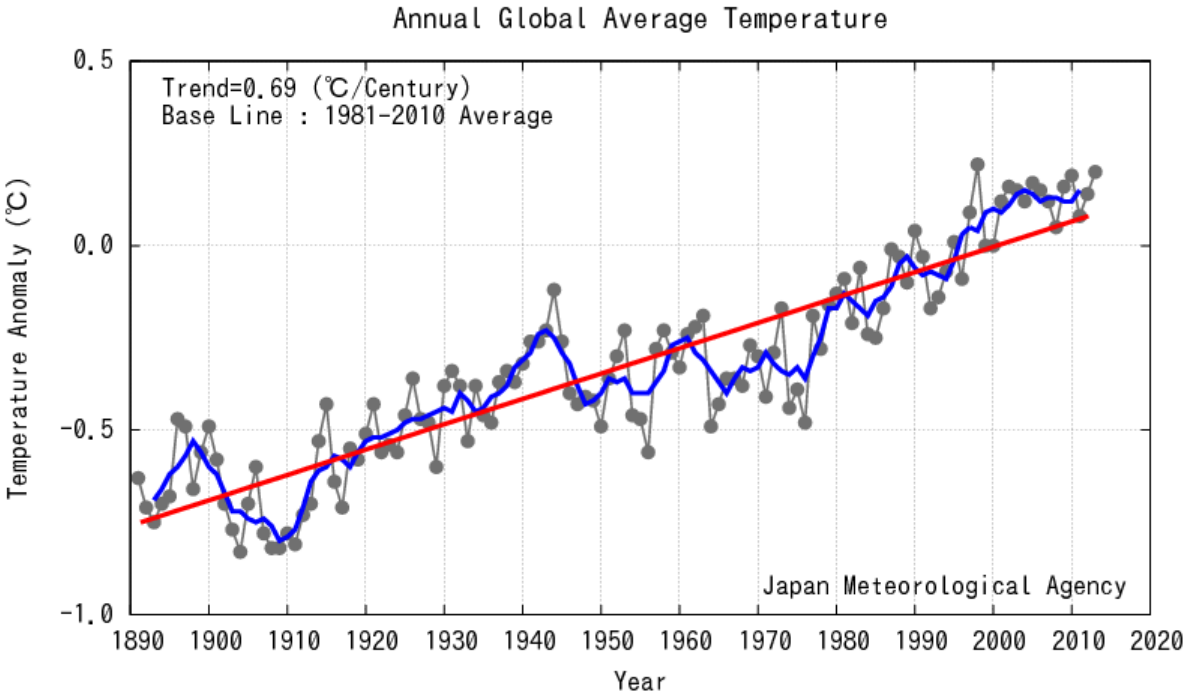

Figure 1 Long-term change in annual mean surface temperature anomalies over the globe

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.

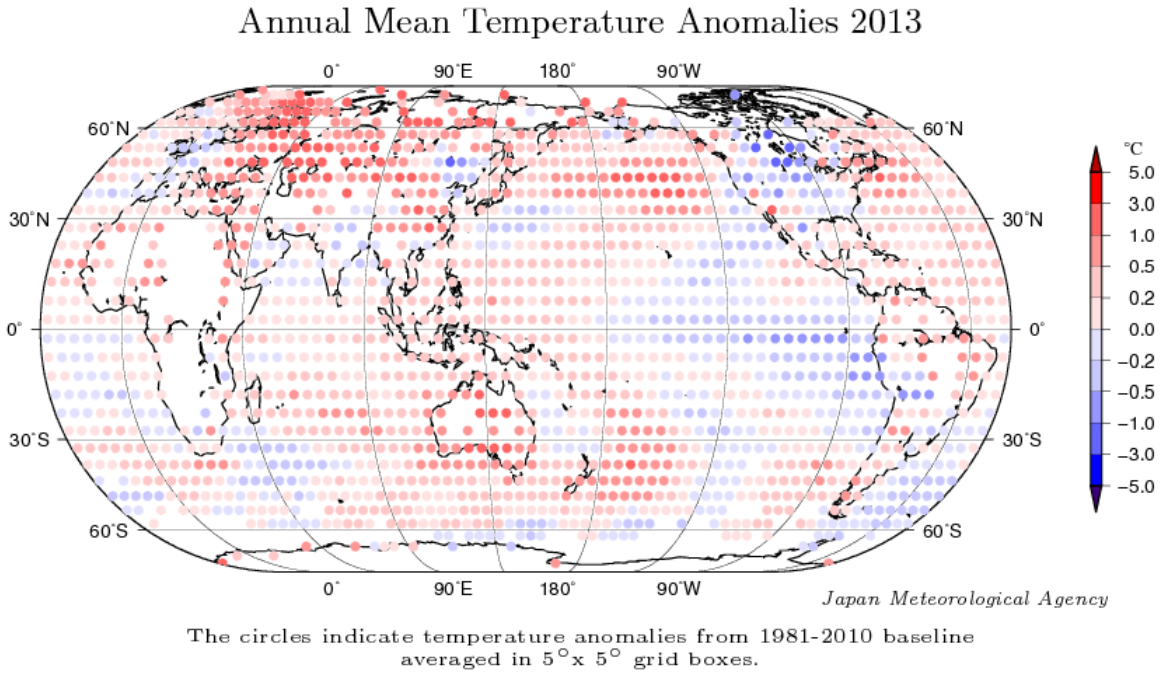

Figure 2 Annual mean temperature anomalies in 2013

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	1998	+0.22
2	**2013**	**+0.20**
3	2010	+0.19
4	2005	+0.17
5	2009	+0.16
	2002	+0.16
7	2006	+0.15
	2003	+0.15
9	2012	+0.14
10	2007	+0.12
	2004	+0.12
	2001	+0.12
13	1997	+0.09
14	2011	+0.08
15	2008	+0.05