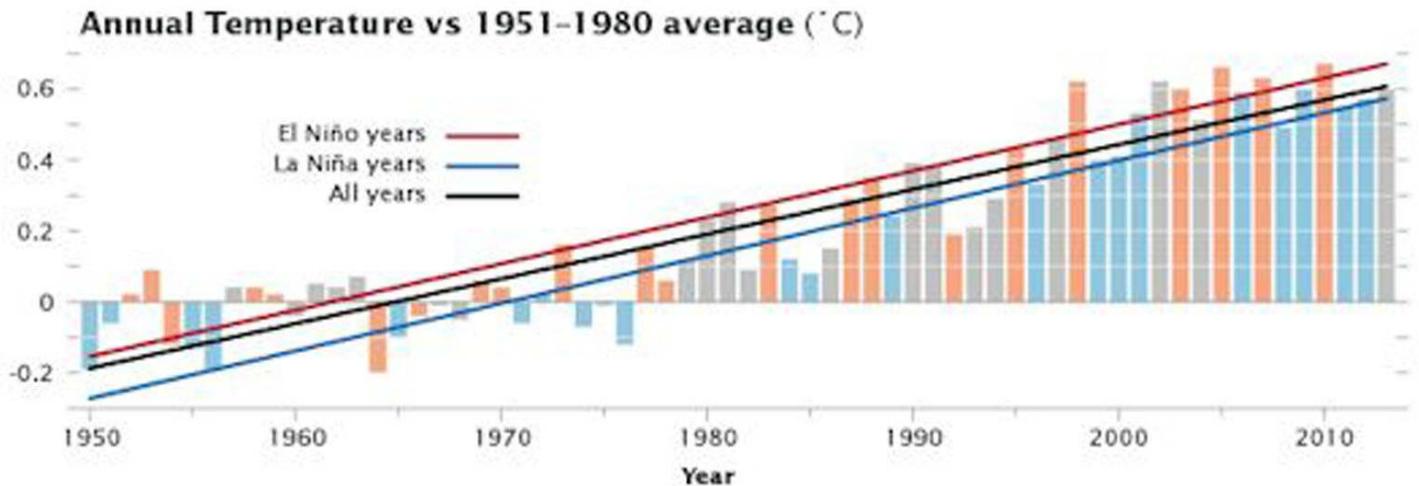


## Long-Term Climate Warming Trend Sustained in 2013

NASA scientists say 2013 tied with 2009 and 2006 for the seventh warmest year since 1880, continuing a long-term trend of rising global temperatures. **With the exception of 1998, the 10 warmest years in the 134-year record all have occurred since 2000**, with 2010 and 2005 ranking as the warmest years on record. The Goddard Institute for Space Studies, which analyses global surface temperatures on an ongoing basis, released an updated report on temperatures around the globe in 2013. The comparison shows how Earth continues to experience temperatures warmer than those measured several decades ago.



"Long-term trends in surface temperatures are unusual, and 2013 adds to the evidence for ongoing climate change," climatologist Gavin Schmidt said. "While one year or one season can be affected by random weather events, this analysis shows the necessity for continued, long-term monitoring."

The average temperature in 2013 was 14.6 Celsius, which is 0.6 C warmer than the mid-20th century baseline. **The average global temperature has risen about 0.8 C since 1880**, according to the new analysis. Exact rankings for individual years are sensitive to data inputs and analysis methods.

Scientists emphasise that weather patterns always will cause fluctuations in average temperatures from year to year, but the continued increases in greenhouse gas levels in Earth's atmosphere are driving a long-term rise in global temperatures. Each successive year will not necessarily be warmer than the year before, but with the current level of greenhouse gas emissions, scientists expect each successive decade to be warmer than the previous.

Carbon dioxide is a greenhouse gas that traps heat and plays a major role in controlling changes to Earth's climate. It occurs naturally and also is emitted by the burning of fossil fuels for energy. Driven by increasing man-made emissions, **the level of carbon dioxide in Earth's atmosphere presently is higher than at any time in the last 800,000 years**. It was about 285 parts per million in 1880, the first year in the global temperature record. By 1960 the atmospheric carbon dioxide concentration was about 315 parts per million. **This measurement peaked last year at more than 400 parts per million**. For some other countries, such as Australia, 2013 was the hottest year on record.

The temperature analysis produced is compiled from weather data from more than 1,000 meteorological stations around the world, satellite observations of sea-surface temperature, and Antarctic research station measurements, taking into account station history and urban heat island effects. Software is used to calculate the difference between surface temperature in a given month and the average temperature for the same place from 1951 to 1980. This three-decade period functions as a baseline for the analysis. **It has been 38 years since the recording of a year of cooler than average temperatures**.

While there are several systems of global temperature analyses, and some may vary in the finer details and methods of data collection, the overall trend in temperature shift show close agreement.