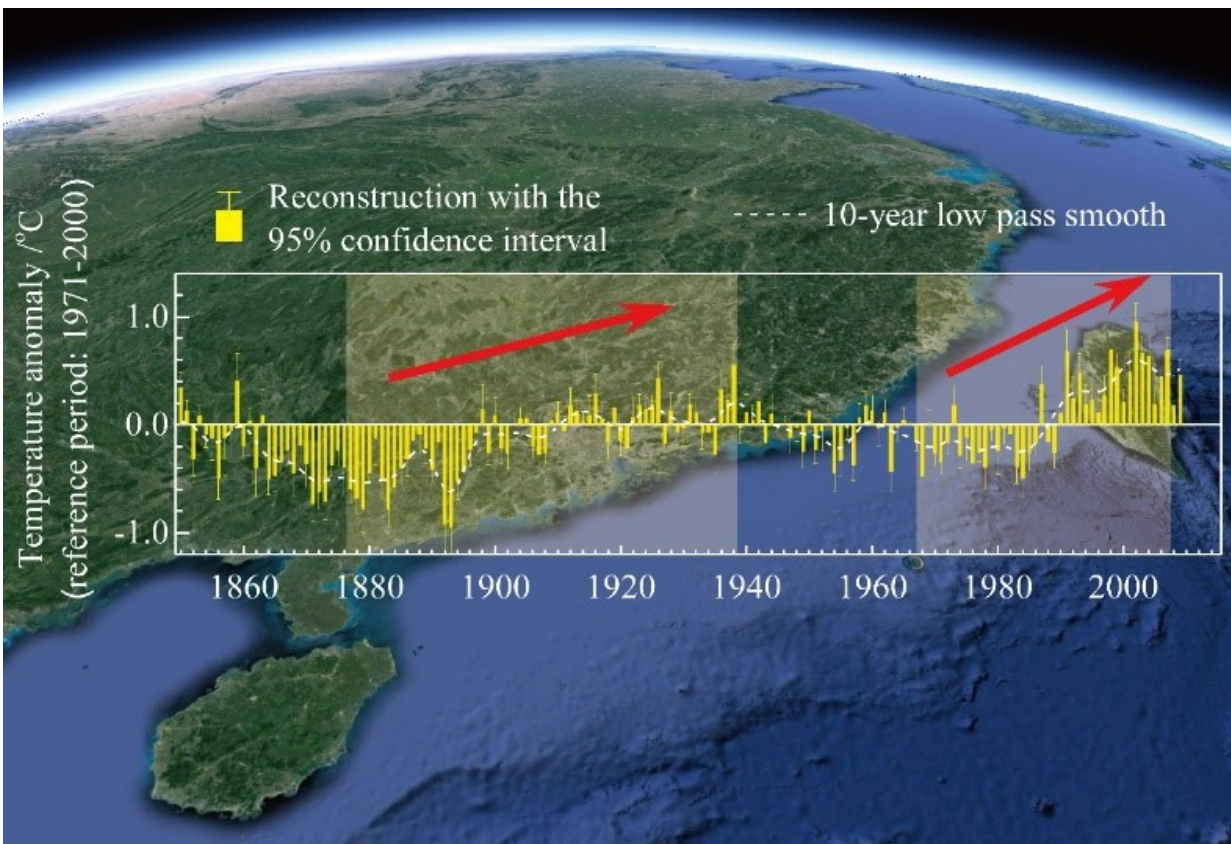


# Two significant warming intervals in southern China since 1850

July 7 2017



Temperature reconstruction in southern China and significant warming intervals.  
Credit: Yang Liu

Regular meteorological observations in most of China only started in the 1950s, so it is therefore necessary to reconstruct regional temperature

series from high-resolution temperature proxies to compensate for the deficiency.

Scientists from the Chinese Academy of Sciences reconstructed the [annual temperature](#) anomaly in southern China during 1850-2009 based on the southern limit of snowfall recorded in Chinese documents, chronologies of tree-ring width, and tree-ring stable oxygen isotope ( $\delta^{18}\text{O}$ ). They used a signal decomposition and synthesis method. The reconstructed series captures 65.8 percent of the variance of observations during 1952-2009, and the variance contributions of different frequency domains for the result is closer to those of [temperature](#) observations than reconstruction from a single proxy.

This multi-proxy-based temperature reconstruction shows robust centennial warming, with a linear trend of  $0.47^\circ\text{C} (100 \text{ yr})^{-1}$  during 1871-2009. Moreover, on the decadal scale, it shows the first rapid cooling as having started in the 1860s, followed by a cold interval until the early 1890s, with the coldest years being 1892 and 1893. The first significant warming is from 1877 to 1938 [ $0.125^\circ\text{C} (10 \text{ yr})^{-1}$ ]. The most rapid rate of increase was  $0.308^\circ\text{C} (10 \text{ yr})^{-1}$  during 1892-1916, resulting in a moderate warm interval during the 1910s-1930s. Then, a slight temperature decline is apparent from the 1940s to the late 1960s. Another significant increase in temperature is shown to start around 1970 [ $0.258^\circ\text{C} (10 \text{ yr})^{-1}$  during 1968-2007], with the highest rate being  $0.512^\circ\text{C} (10 \text{ yr})^{-1}$  during 1983-2002, though a warming hiatus occurs in the 2000s. Compared with the warm interval in the 1910s-1930s, the temperature in the 1980s-2000s is much higher. These results reveal that both the level of warmth and the warming rate from the 1980s are unprecedented since 1850.

This work, published in [Advances in Atmospheric Sciences](#), provides an independent case to validate the global [warming](#) of the past 160 years and its recent hiatus.

**More information:** Yang Liu et al, Unprecedented warming revealed from multi-proxy reconstruction of temperature in southern China for the past 160 years, *Advances in Atmospheric Sciences* (2017). [DOI: 10.1007/s00376-017-6228-x](https://doi.org/10.1007/s00376-017-6228-x)

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