Temperature Anomaly History Adds to Global Warming Evidence

As regular meteorological observations in most parts of China started only in the 1950s, it is necessary to reconstruct regional temperature series from high-resolution temperature proxies. Recently, scientists from the Institute of Geographic Sciences and Natural Resources Research, Chinese Academy of Sciences have reconstructed the annual temperature anomalies in southern China between the year 1850 and 2009 based on the southern limit of snowfall recorded in historical documents, chronologies of tree-ring width, and tree-ring stable oxygen isotope ($\delta^{18}O$), using the method of signal decomposition and synthesis.

The reconstructed series captured 65.8% of the variance of observations during 1952–2009, and the variance contributions of different frequency domains for the result were found closer to those of temperature observations than reconstruction from a single proxy.

The multi-proxy-based temperature reconstruction showed robust centennial warming, with a linear trend of 0.47°C/100 yr during 1871–2009. Moreover, on the decadal scale, it showed the first rapid cooling as having started from the 1860s, followed by a cold interval until the early 1890s, with the coldest years being 1892 and 1893.

The first significant warming was from the year 1877 to 1938: 0.125°C/10 yr, with the most rapid rate of increase being 0.308°C/10 yr during 1892–1916, resulting in a moderate warm interval during the 1910s-1930s. Then, a slight temperature decline was apparent from the 1940s to the late 1960s.

The second significant increase in temperature was shown to start around 1970: 0.258°C/ 10 yr during 1968-2007, with the highest rate being 0.512°C/10 yr during 1983–2002, though a warming hiatus occurred in the 2000s. Compared with the warm interval in the 1910s–1930s, the temperature in the 1980s–2000s was much higher.

These results revealed that both the level of warmth and the warming rate from the 1980s have been unprecedented since 1850. And this offered an independent case study to validate the global warming phenomenon of the past 160 years and its recent hiatus.

Their paper has be published in the journal of *Advances in Atmospheric Sciences*.