Study finds temperature reconstructions during the Common Era are affected by the selection of paleoclimate data

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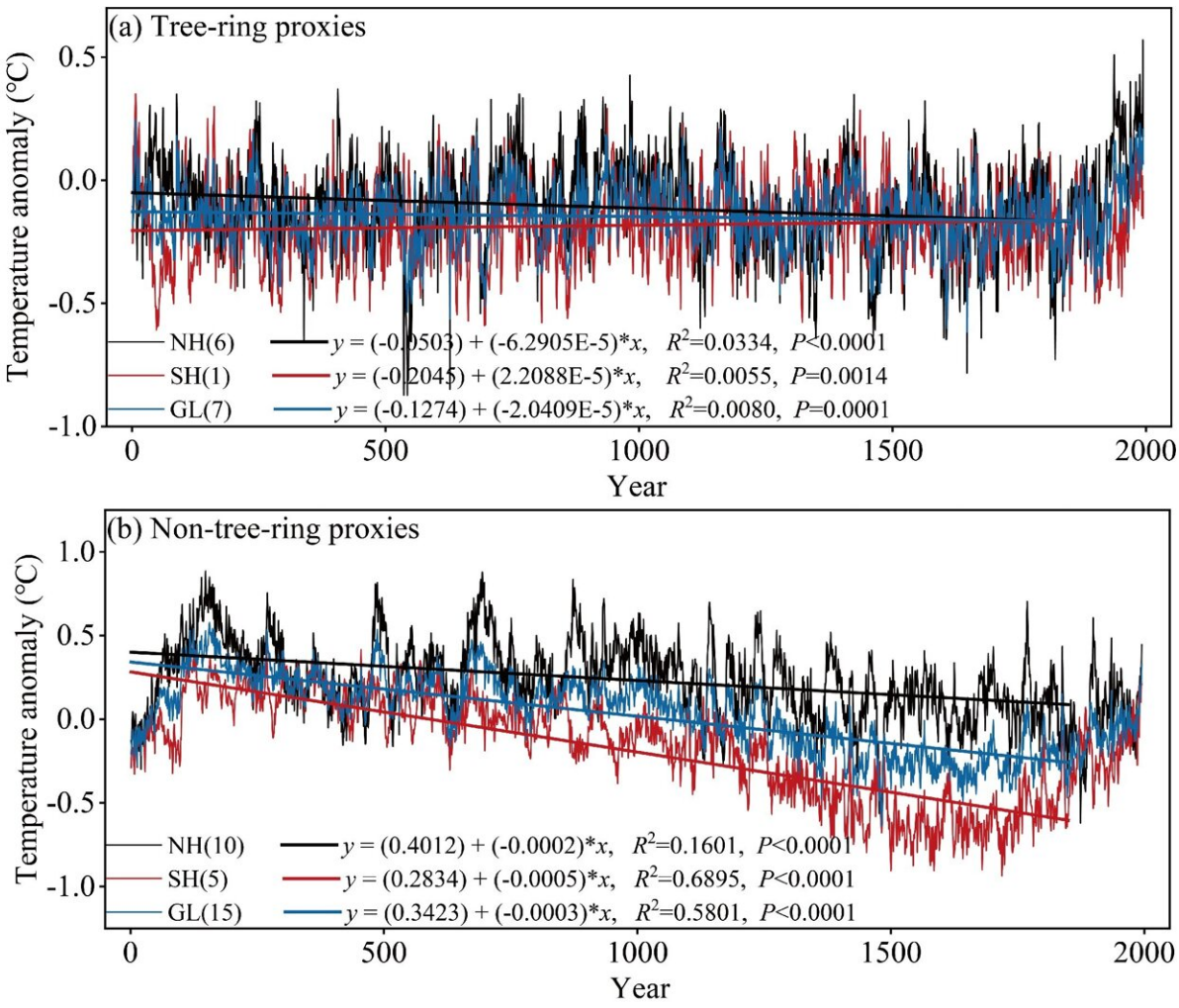

(a) Tree-ring based annual temperature reconstructions for the global (GL), Northern Hemisphere (NH), and Southern Hemisphere (SH). (b) Non-tree-ring

based reconstructions for the same spatial domains. Credit: Science China Press

Paleoclimate data, also known as climate proxies, is essential for investigating past climate variability and can help assess the extent of recent climate change.

"Although the intensifying proxy network has improved the quality of recent large-scale climate reconstruction products, we wanted to know how our understanding of climate in the past is dependent on proxies," says Professor Bao Yang.

A paper on this topic is published in the journal *Science China Earth Sciences*.

To do so, the research team led by Professor Yang integrated the longest millennial paleoclimate data in the PAGES proxy network into new versions of global and hemispheric reconstructions of annual temperatures. The results show that the rate of pre-industrial millennial cooling in global and hemispheric temperatures varies according to proxy combination, with the strongest cooling revealed by non-tree-ring proxies.

Yang and colleagues compared the volcanic responses and spectral characteristics of tree-ring and non-tree-ring records. They found that the properties of tree-ring and non-tree-ring data differ significantly.

"All the evidence points out that we are still far from a complete understanding of the Common Era temperature variability at hemispheric and global scales," says Professor Yang.

Due to uncertainties and distinct properties of proxy records, decision-

making on the selection of proxy becomes crucial for climate reconstruction.

This study was led by Yang, a professor at Nanjing University in China, and co-authored by researchers at Nanjing University, the Northwest Institute of Eco-Environment and Resources, Chinese Academy of Sciences, China, and the National Institute of Scientific Research in Canada.

More information: Bao Yang et al, The influence of proxy selection on global annual mean temperature reconstructions during the Common Era, *Science China Earth Sciences* (2024). DOI: 10.1007/s11430-024-1348-3

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