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Tree rings reveal weakening of annual temperature cycle over the Tibetan Plateau since the 1870s

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The annual cycle of extra-tropical surface air temperature is an important component of the Earth's climate system. A reduced amplitude of this mode over the past decades has been observed in some regions. Although attributed to anthropogenic forcing, it remains unclear when dampening of the annual cycle started. Here, we use residual series of tree-ring width and maximum latewood density from the Tibetan Plateau >4000 m asl to reconstruct changes in temperature seasonality over the last three centuries. The new proxy evidence suggests that the onset of a decrease in summer-to-winter temperature difference over the Tibetan Plateau coincided with an increase in atmospheric sulphate concentration as early as the 1870s. These results imply that future alterations of atmospheric composition may further contribute to a weakening of the annual temperature cycle, with subsequent effects on ecosystem functioning and productivity.