The Laboratory of Tree-Ring Research

presents a talk by

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A spatial field reconstruction of North American summer air temperatures derived from a tree-ring blue intensity network

Wednesday, October 13, 2021 - 12:00pm to 1:00pm
Room: Zoom Only

Spatially-resolved climate field reconstructions are opportune for analyzing spatial anomaly patterns and characterizing regional-scale trends resultant from climate change. To date, few fine-scale (<5° by 5°) spatially-resolved paleo-temperature datasets exist in the Northern Hemisphere, especially those with representation of locations below 40° N. Here, we present the development of a 2.5x2.5° gridded temperature field reconstruction of summer (June-August) mean surface air temperatures, developed from a network of blue intensity and tree-ring width chronologies. In current form, this spatial reconstruction provides multi-centennial- to millennial-length representation for the continental United States, parts of southern Canada, and northern Mexico. Statistical calibration and validation tests indicate that tree ring predictors for each of the individual grid points provide robust estimates of historical temperature variability across many parts of North America. Further, we identify areas of North America where more data are needed to improve both the spatial and temporal gaps in the coverage of the paleo-temperature atlas. The creation and implementation of this gridded paleo-temperature atlas will allow us to examine and compare the historical presence, persistence, and modes of external forcings of East/West and North/South trends in surface air temperatures across North America. Further, a completed paleo-temperature atlas will improve our understanding of the relationships between temperature and hydroclimate via direct comparisons to other pre-existing gridded climate datasets of drought and snowpack across North America. We highlight the importance of increasing the density of temperature-sensitive tree-ring predictors in North America by the creation of new collections, but we also strongly emphasize the utility of re-examining pre-existing tree ring collections using novel techniques such as blue intensity. As such, we propose network-wide collaboration of tree-ring researchers in order to improve this dataset for its optimum effectiveness and usage by the broader paleo-climate community.

The University of Arizona