Abstract Title: 
Dendroclimatic Analysis of Climate Oscillations for the Southeastern United States from Tree-Ring Network Data

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Dendrochronology V: Dendroclimatolgy

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Abstract:
Three tree-ring width chronologies obtained from field collection and previous research are used to represent tree growth in coastal plain region and the eastern and western Great Smoky Mountains areas along a longitudinal transect in the southeastern United States. Tree species include Table Mountain pine (Pinus pungens Lamb.), longleaf pine (Pinus palustris Mill.) and shortleaf pine (Pinus echinata Mill.). Correlation analysis and multiple regression analysis were used to examine gradient responses of radial growth to regional climate, especially to oceanic oscillations: the North Atlantic Oscillation (NAO), Atlantic Multidecadal Oscillation (AMO), and Pacific Decadal Oscillation (PDO). Results of response function analyses indicated the most significant climatic limiting factor for each site and whether differences exist along the gradient in the strength of the particular climatic impacts among sites. Considering the diverse topography and possible disturbances to the southeastern forests, interpretations of how trees respond to climate may show a variety of trends, not just a simple decreasing trend in the strength of the response from the coast to interior locations. Reconstructions of NAO, AMO, and PDO index were developed using the composite chronology from the three sites. Associations among climate oscillations were evaluated and extreme climate events (such as the mid-1950s drought) provided guidance when examining the variability of different oscillations over latest 200 years. This study aims to provide a better understanding of the relationships and interaction between climate and ecosystem functions from a dendroclimatic perspective in the southeastern United States.

Keywords:
tree-ring network, climate oscillations, the southeastern United States