

Correlations of climate indices and *Pinus taeda* Growth Rates

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ABSTRACT: By comparing the growth rates of *Pinus taeda* within Tier II sites of the PINEMAP (Pine Integrated Network: Education, Mitigation, Adaptation Project) program to historical climate data, so that the spatial correlations and the best climate data indices to predict and inform future growth rates can be determined. We examined three sets of cores from eight trees per site in the historical growth range of loblolly pine, in order to try to mitigate the variances of small scale regional inconsistencies. The best cores, those that contained the bark, and with minimal distortion from missing the pith, from each tree were measured and the mean growth rate of each site was calculated. The correlation coefficient between the means, over the life of the tree, and several climatic indices, including: Palmer Drought Severity Index, Palmer Modified Drought Index, Z-Index, Palmer Hydrological Drought Index, precipitation and Temperature are calculated and geographically mapped. The climate data indices are derived from the NOAA designated climate regions. Growth rates was positively correlated with precipitation (67% of sites with $r > 0.3$) and the Z-index (64% of sites with $r > 0.3$). Strongly correlated sites did not display a spatial pattern across the south east region of the United States. Our results suggest simple precipitation levels provide a good prediction for growth rates, while more complex indices may not provide greater predictive values.

KEYWORDS: Loblolly pine, growth response, climate variables, dendrochronology