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SPATIAL AND TEMPORAL PATTERNS OF PRE-INSTRUMENTAL DROUGHT IN EASTERN NEVADA, USA

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ABSTRACT: In the Great Basin of North America, proxy records of drought are important to place instrumental records of water resources into a longer historical context, and to provide managers with a wider spectrum of potential future scenarios. Ecotonal environments characterized as lower forest border sites are ideally suited for tree-ring reconstructions of hydroclimatic variability. A network of 26 tree-ring chronologies, some longer than 800 years, was recently developed from single-leaf pinyon (*Pinus monophylla*) and ponderosa pine (*Pinus ponderosa*) tree-ring samples for eastern Nevada, in the central Great Basin of North America. Cluster and principal component analysis of the tree-ring chronologies show the existence of spatially separated bioclimatic units. Calibration of dendroclimatic records with instrumental data was done using bootstrapped correlation and response functions on multiple time intervals. The period in common among all tree-ring chronologies was used to develop spatial maps of drought at annual resolution. The longest chronologies were then used to extend the drought record as far back in time as possible. The most significant climatic episodes were numerically identified and modeled using their duration, magnitude, and peak, to estimate the likelihood of severe and sustained drought in this region. Multi-century long dendroclimatic records are essential to disentangle the effects of climate on vegetation dynamics from those of land use changes (grazing, fire suppression, etc.) since Euro-American settlement, and to provide a range of historical variability well beyond the envelope of instrumental records.

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