Abstract Title:
Relationships Between Rocky Mountain Juniper Growth and Climate at El Malpais National Monument and the Zuni Mountains, New Mexico, U.S.A.

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Abstract:
Long-lived tree specimens can serve as proxy records for the principal environmental factors associated with annual tree growth. Dendrochronologists, scientists that study tree rings, have identified that some Southwestern conifer trees, including Rocky Mountain juniper, can live to very old ages in certain forest settings. Significant contributions to this research stem from data collected on the rugged lava flows, or malpais ("badlands"), of Cibola County, New Mexico. We created two Rocky Mountain juniper chronologies for Cibola County, one for El Malpais National Monument and a second for the nearby Zuni Mountains. High average mean sensitivity values indicate that our chronologies exhibit enough annual variability to detect fluctuations in environmental conditions. The average interseries correlation for both chronologies was statistically significant for confident crossdating, which suggests a strong association among annual growth within the stand. Growth trends among Rocky Mountain juniper sampled for this study could be related to climatic variability. Precipitation might act as the primary growth determinant shared by most Rocky Mountain juniper assessed in our study. Our multi-century chronologies provide resource managers an enhanced perspective of precipitation patterns and forest dynamics on the lava flows of El Malpais National Monument and the Zuni Mountains.

Keywords:

Rocky Mountain juniper; Dendrochronology; Old-Growth Forest; Climate