

A tree-ring oxygen isotope chronology from Yakushima Island and its dendroclimatic potential

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Recent progress in isotope dendroclimatology showed that tree-ring oxygen isotopes are a promising proxy to reconstruct past precipitation and/or relative humidity. In the present study, we developed a 300-year tree-ring oxygen isotope chronology using Japanese cedar (*Cryptomeria japonica*) growing in Yakushima Island, southern Japan, and explored its dendroclimatic potential. Two tree samples that were crossdated by visually matching ring-width variations were used for oxygen isotopic analysis. The resulting oxygen isotope series for the period 1700-2009 C.E. were highly correlated with each other ($r = 0.68$), indicating that common signals related to local climate are preserved in these data. Both the delta-18O series were individually normalized to have zero mean and unit variance, and the resulting series were averaged to build the final chronology. Response analysis with monthly climatic records (temperature, precipitation and relative humidity) from the Kagoshima station revealed that tree-ring delta-18O was primarily controlled by relative humidity and precipitation in the summer season (May-September). Perhaps the most striking feature of the delta-18O chronology is a significant increasing trend over the 20th century, indicating a decrease in summer relative humidity in the study region. We will present an extended version of the tree-ring delta-18O chronology over the past 1000 years or so.

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