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Comparison of the Responses of Radial Growth to Climate Change for Two Dominant Coniferous Tree Species in the Guancen Mountain, North-Central China †

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Abstract: The radial growth of coniferous trees in the mid-high latitudes of the Northern Hemisphere has an unstable response to climate warming. We analyzed the differences in the radial growth patterns of the two dominant species (Larix principis-rupprechtii Mayr and Picea meyeri Rehd. et Wils.) on Guancen Mountain, north-central China, and the differences in the stability of their radial growth in response to climate change. Pearson correlation and sliding analysis were performed to study the correlations and dynamic relationships between radial growth and climatic factors. The main results are as follows: (1) the standard chronologies of L. principis-rupprechtii and P. meyeri contained rich climate information, and the radial growth of L. principis-rupprechtii was more sensitive to climatic factors than that of P. meyeri; (2) on a long-term scale, changes in the radial growth of L. principis-rupprechtii and P. meyeri in response to the monthly mean temperature and standardized precipitation evapotranspiration index (SPEI) were unstable; (3) after the abrupt temperature change, the interannual basal area increments (BAIs) of the two dominant species followed an upward trend, and the radial growth rate of L. principis-rupprechtii was much greater than that of P. meyeri. The results of this paper can help to understand the response of the radial growth of coniferous forests in north-central China to future climate change, and provide a basis for future forest cultivation in the middle and high latitudes of the northern hemisphere.

Keywords: dendroclimatology; tree-ring width; climate response; dominant conifer species