



Can tree-ring proxy reflect summer temperature extremes and their associated circulation patterns over Fennoscandia?

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Tree-ring maximum latewood density (MXD) records in Fennoscandia have been widely used to infer the regional and hemispheric-scale mean temperature variability. Here, we explore whether the tree-ring record can be used to infer the variability of summer temperature extremes over Fennoscandia through a statistical analyses of gridded instrumental reanalysis and tree-ring data. The first principal component (PC1) of the MXD network in Fennoscandia, which explains 50% variance of the summer warm-day extreme variability over the period 1901-1978, has a mopolar structure with the highest loadings in the central and northern part of Fennoscandia. The corresponding time series (PC1) is influenced by the variability of a blocking-like anticyclonic pattern over Fennoscandia, and the northward shift of northeast Atlantic high-altitude jet stream. The strongest correlations are found between the PC1 and the summer warm-day extremes over Fennoscandia, consistent with the anticyclonic pattern. This study shows that the Fennoscandian MXD network can be used to infer the variability of the past high-temperature extremes in Fennoscandia and their associated circulation patterns over summer.