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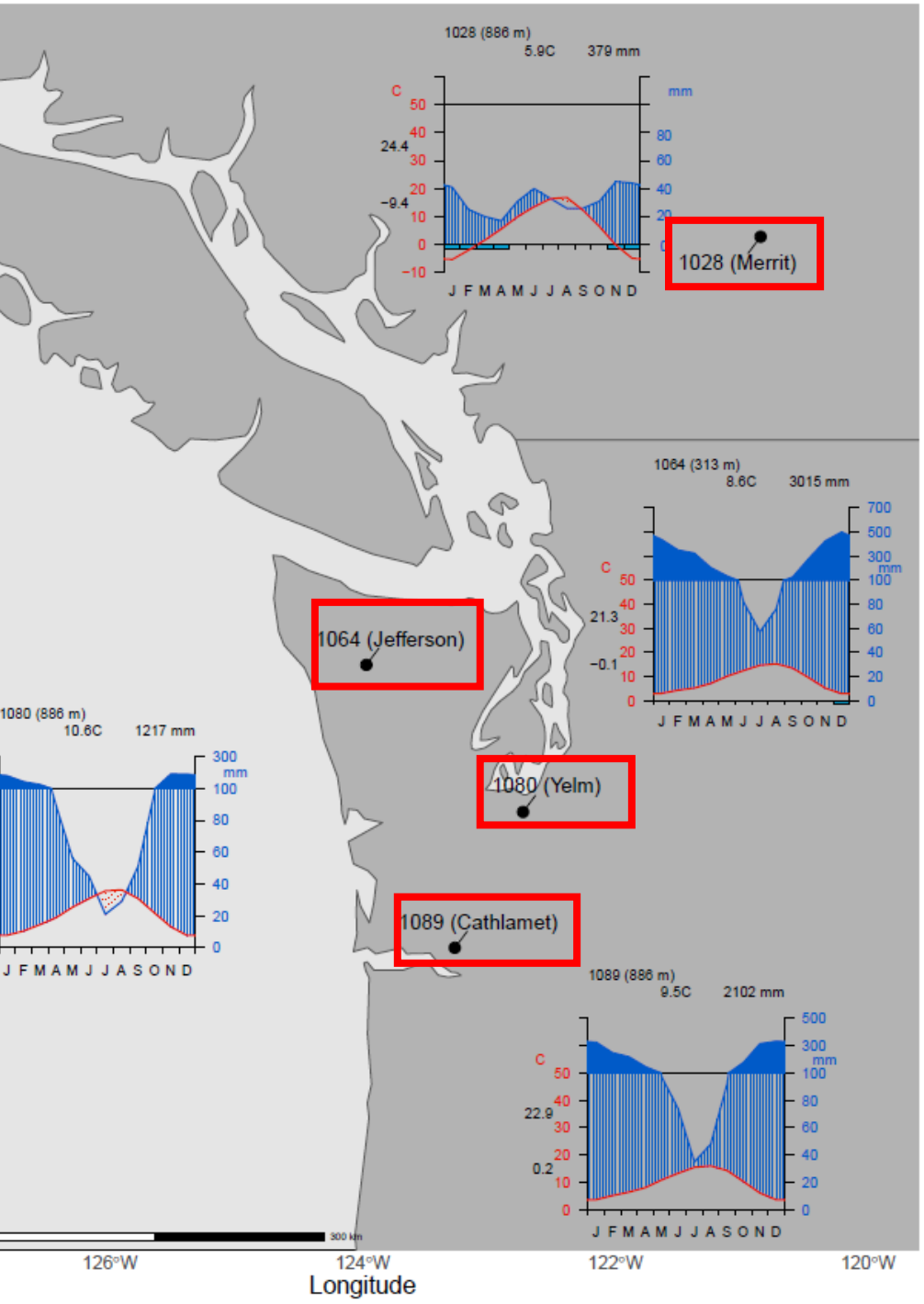
Tree rings, wood density and climate-growth relationships of four Douglas fir provenances in sub-Mediterranean Slovenia

Luka Krajnc[1], Jožica Gričar[1], **Jernej Jevšenak[1]**, Polona Hafner[1] and Robert Brus[2]

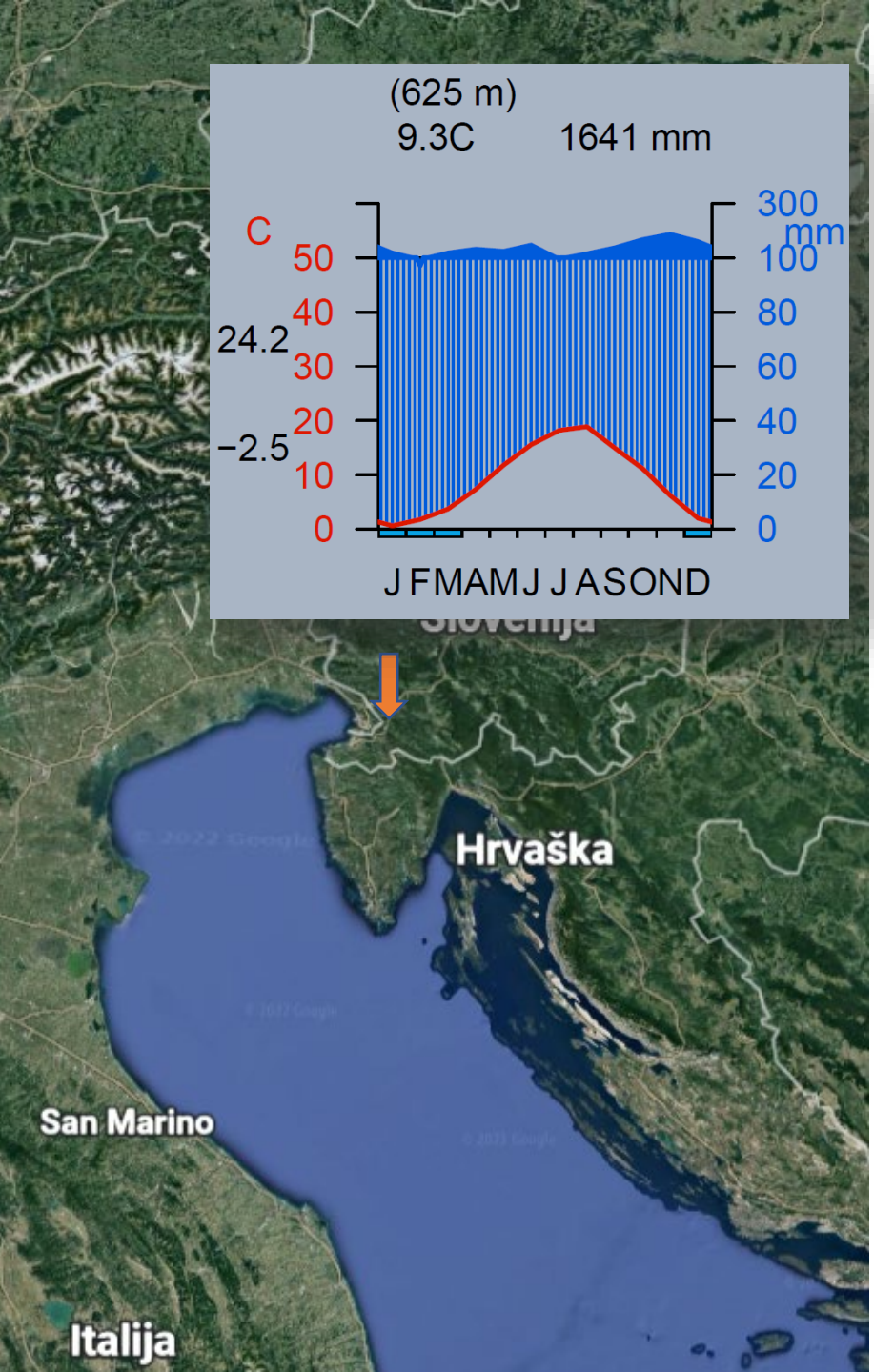
[1]Slovenian Forestry Institute, Ljubljana, Slovenia

[2]Biotehnical Faculty, University of Ljubljana, Ljubljana, Slovenia



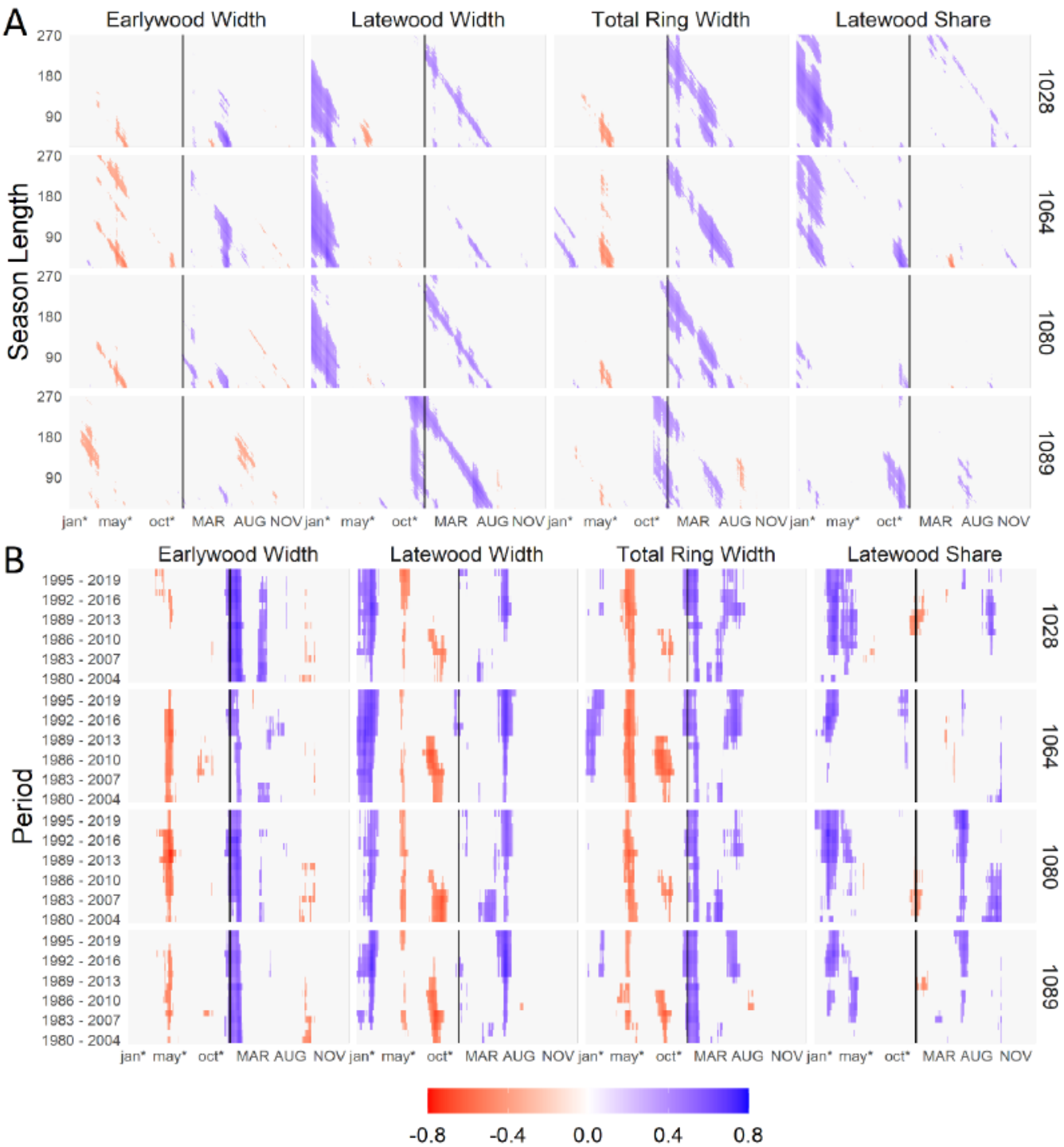
Background

- Douglas fir (*Pseudotsuga menziesii* (Mirb.) Franco) is often considered as a potential substitute for Norway spruce (*Picea abies*) due to its vulnerability related to changing climate and extreme weather events
- It is popular due to its wood properties, fast growth characteristics and improved resilience to drought
- Douglas fir originates from the western part of the United States and Canada, where it grows in a wide range of site conditions and therefore displays high adaptive genetic variability
- To maximize the probability of successful planting, we need to compare growth characteristics of different proveniences growing on the same site



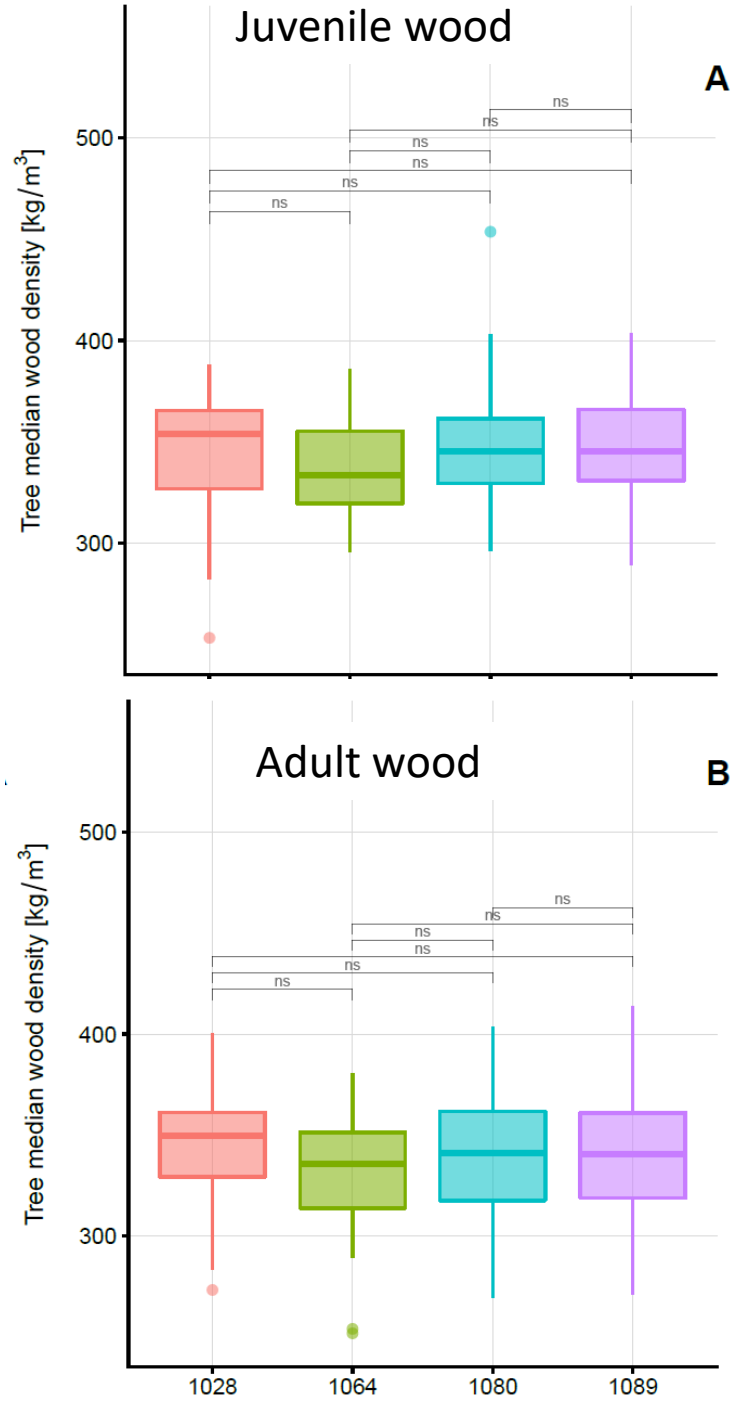
Methods

- The Douglas fir provenance trial was established in 1971 in sub-Mediterranean region of Slovenia
- We sampled 12-18 cores from 4 proveniences and measured total ring widths (TRW), earlywood (EWW), latewood widths (LWW) and latewood share
- The effect of climate was analyzed with daily SPEI correlations, separately for juvenile and adult wood
- Resistance drilling was used to compare wood density profiles among different proveniences



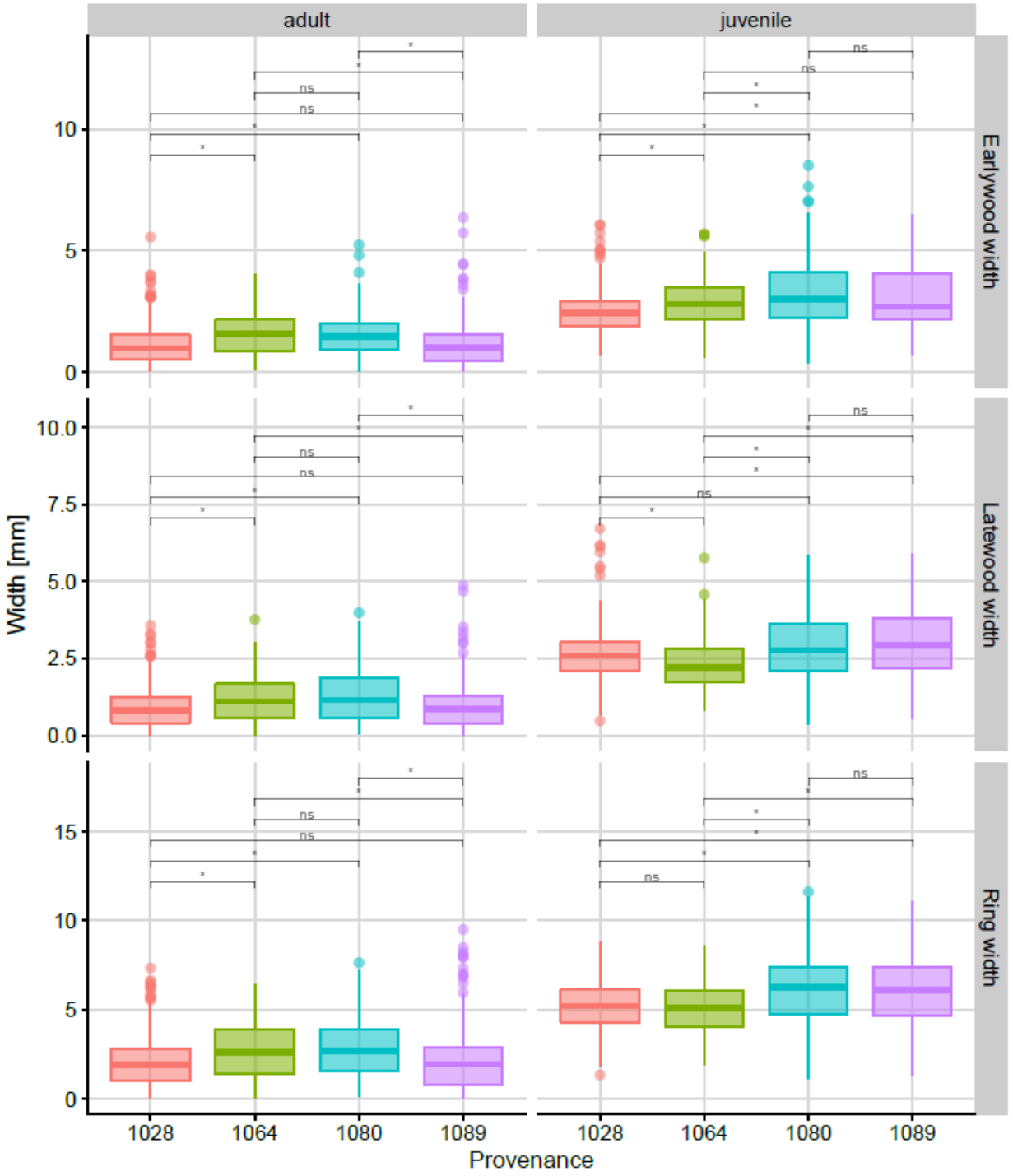
Results

- Positive effect of wet conditions in current year
- Negative correlations with previous year SPEI
- Temporal instability of correlations
- Minor differences among proveniences



Results

- There were no differences in wood density of A) juvenile and B) adult wood between studied proveniences



Results

- There were no differences in wood density of A) juvenile and B) adult wood between studied proveniences
- Only minor differences in tree-ring characteristics: provenances 1064 and 1080 have larger annual radial increments than provenances 1028 and 1089.

Conclusions

- All proveniences showed similar growth characteristics, wood density profiles and correlations with SPEI
- Provenances 1064 and 1080 had the largest annual radial increments, and also the most homogeneous growth in the adult phase
- The importance of assessing different criteria when evaluating the performance of specific proveniences