Influence of silviculture treatments on climate-growth relationships in spruce stands: A case study from southern Sweden

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Objective

Long-term monitoring of permanent research plots helps to predict the response pure Norway spruce stands to drought stress. We hypothesized that the resilience to drought will be strengthened in stands with silvicultural treatment. The project aimed to identify a silvicultural management (forest tending) of Norway spruce stands that ensure sustainable wood production and enhancing resilien-

Hypothesis

H1: Thinning from below improves the growth performance of spruce stands under drought stress.

H2: Norway spruce growth performance during drought stress is a function of stand management and resulting stand

Methods

- Study sites: SLU, Tönnersjöhedens försökspark
- Sampling Norway spruce from stands with different silviculture management
- Measuring tree rings in the laboratory using CooRecorder
- Cross-dating of all tree ring series and their averaging within each tree, detrending using Spline (15 years wavelength)
- Creation of indexed site standard chronology for all studied categories (R soft., package dplR)
- Calculation of Pearson's correlations between indices of tree-rings widths (RWI) and monthly climatic variables in R software, package treeclim

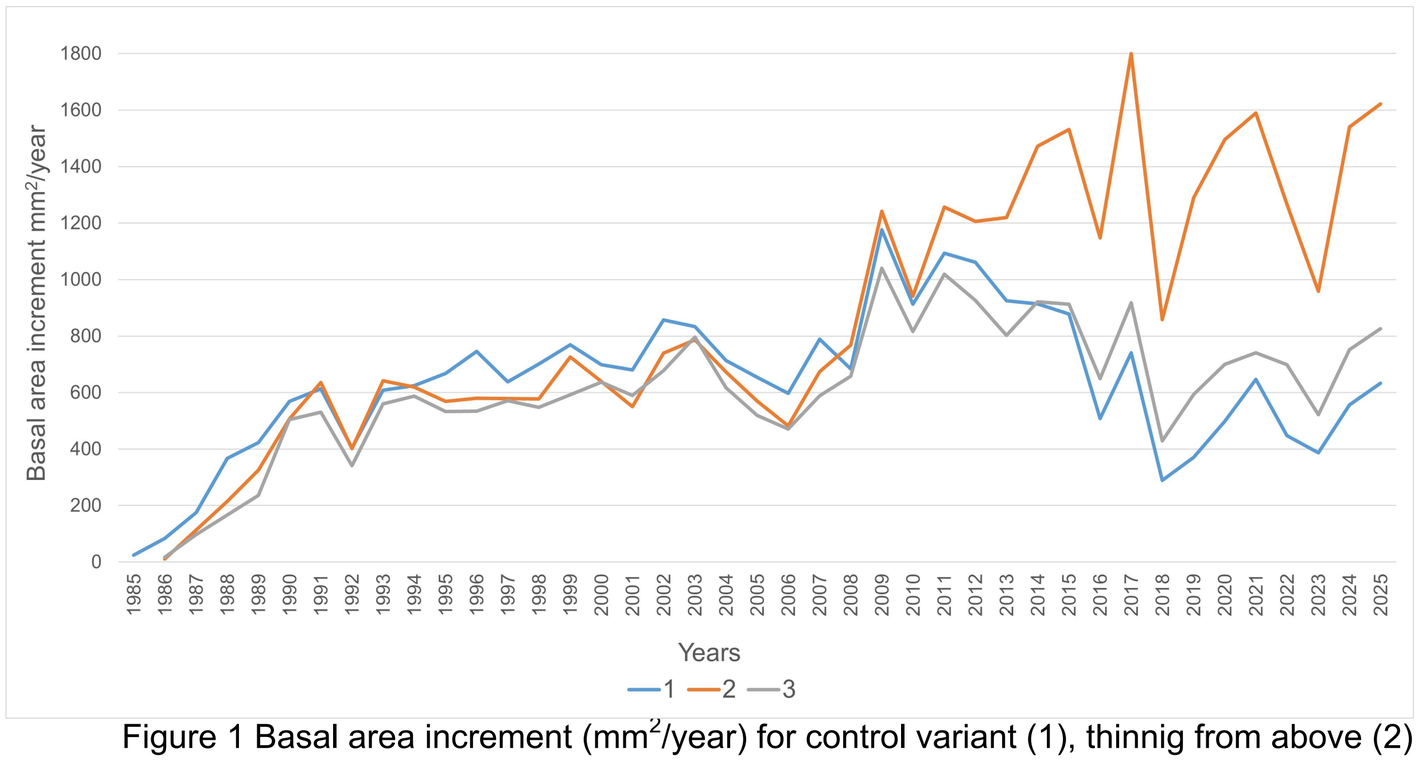

Figure 1 Basal area increment (mm^2/year) for control variant (1), thinnig from above (2) and thinnig from below (3)

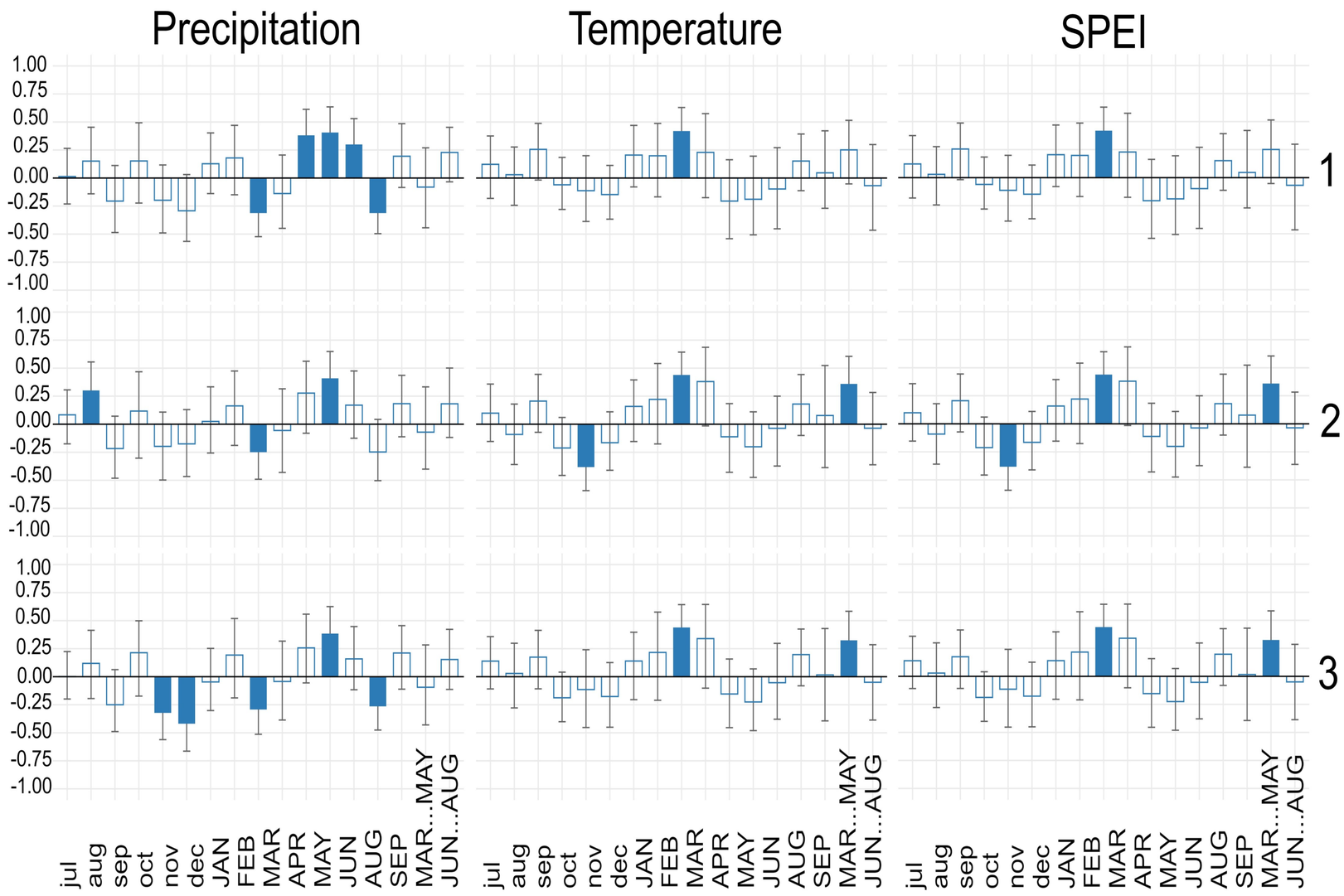

Figure 2 Pearson‘s correlation charts for control variant (1), thinnig from above (2) and thinnig from

Partial results and discussion

Based on the analyses, a long-term higher BAI increase is obvious for the second variant, especially after 2010. Climate-growth relationships reveal that both thinning regimes reduce influence of precipitation in the year of tree ring formation. However, thinning from bellow variant was negatively influenced by winter precipitation. This suggests that most suitable approach is thinning from above, which enhanced growth and reduced influence of climate on growth. This corresponds with conclusions published by Bréda et al., 1995 and Sohn et al., 2016.

REFERENCES

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