

Correlating radial growth of European beech to remotely sensed indices, precipitation and temperature across Europe

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“Land Cover Dynamics Precursors of Land Cover Change in SCERIN”

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Tree-growth data

32 plots of European beech across Europe

Annals of Forest Science
DOI 10.1007/s13595-017-0660-z



DATA PAPER

EuMIXFOR empirical forest mensuration and ring width data from pure and mixed stands of Scots pine (*Pinus sylvestris* L.) and European beech (*Fagus sylvatica* L.) through Europe

Michael Heym¹ · Ricardo Ruíz-Peinado^{2,3} · Miren Del Río^{2,3} · Kamil Bielač⁴ · David I. Forrester⁵ · Gerald Dirnberger⁶ · Ignacio Barbeito⁷ · Gediminas Brazaitis⁸ · Indrė Ruškytė⁸ · Lluís Coll⁹ · Marek Fabrika¹⁰ · Lars Drössler¹¹ · Magnus Löf¹¹ · Hubert Sterba⁶ · Václav Hurl¹² · Viktor Kurylyak¹³ · Fabio Lombardi¹⁴ · Dejan Stojanović¹⁵ · Jan Den Ouden¹⁶ · Renzo Motta¹⁷ · Maciej Pach¹⁸ · Jerzy Skrzyszewski¹⁸ · Quentin Ponette¹⁹ · Géraud De Strel¹⁹ · Vit Sramek²⁰ · Tomáš Čihák²¹ · Tzvetan M. Zlatanov²² · Admir Avdagic²³ · Christian Ammer²⁴ · Kris Verheyen²⁵ · Buraczyk Włodzimierz⁴ · Andrés Bravo-Oviedo^{2,3} · Hans Pretzsch¹

Eur J Forest Res
DOI 10.1007/s10342-015-0900-4



ORIGINAL PAPER

Growth and yield of mixed versus pure stands of Scots pine (*Pinus sylvestris* L.) and European beech (*Fagus sylvatica* L.) analysed along a productivity gradient through Europe

H. Pretzsch¹ · M. del Río² · Ch. Ammer³ · A. Avdagic⁴ · I. Barbeito⁵ · K. Bielač⁶ · G. Brazaitis⁷ · L. Coll⁸ · G. Dirnberger⁹ · L. Drössler¹⁰ · M. Fabrika¹¹ · D. I. Forrester¹² · K. Godvod⁷ · M. Heym¹ · V. Hurl¹³ · V. Kurylyak¹⁴ · M. Löf¹⁰ · F. Lombardi¹⁵ · B. Matović¹⁶ · F. Mohren¹⁷ · R. Motta¹⁸ · J. den Ouden¹⁷ · M. Pach¹⁹ · Q. Ponette²⁰ · G. Schütze¹ · J. Schweig¹ · J. Skrzyszewski¹⁹ · V. Sramek²¹ · H. Sterba⁹ · D. Stojanović¹⁶ · M. Svoboda²² · M. Vanhellemont²³ · K. Verheyen²³ · K. Wellhausen¹ · T. Zlatanov²⁴ · A. Bravo-Oviedo²

Journal of Ecology

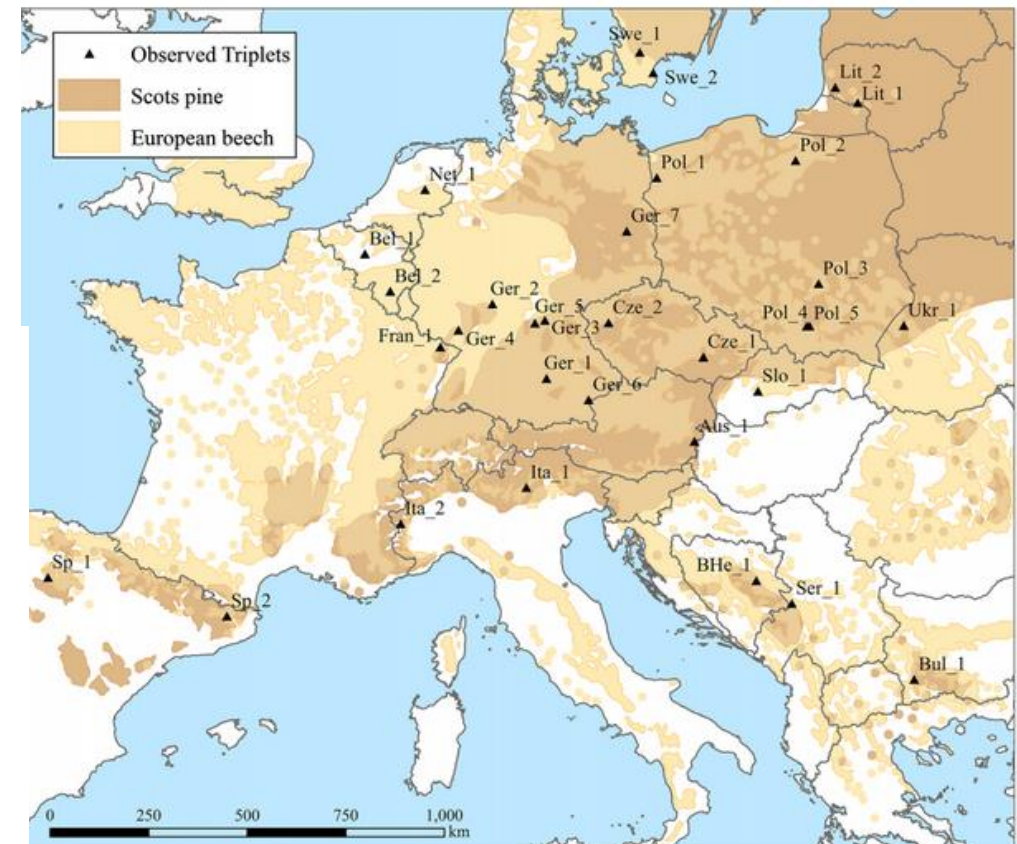


Journal of Ecology

doi: 10.1111/1365-2745.12727

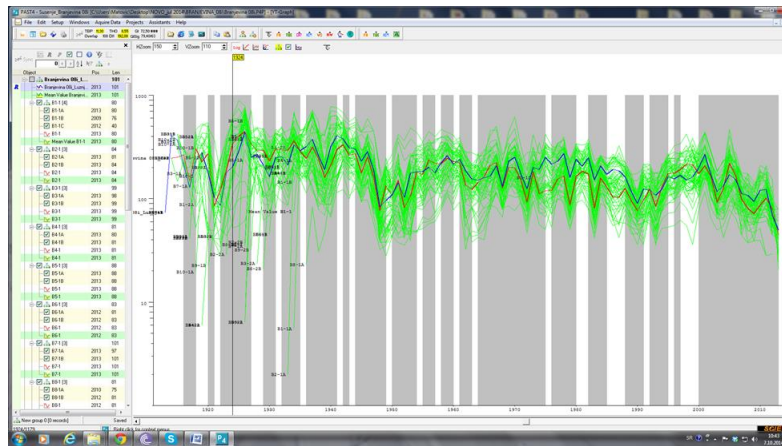
Species interactions increase the temporal stability of community productivity in *Pinus sylvestris*–*Fagus sylvatica* mixtures across Europe

Miren del Río^{1,2*}, Hans Pretzsch³, Ricardo Ruíz-Peinado^{1,2}, Evy Ampoorter⁴, Peter Annighöfer⁵, Ignacio Barbeito⁶, Kamil Bielač⁷, Gediminas Brazaitis⁸, Lluís Coll⁹, Lars Drössler¹⁰, Marek Fabrika¹¹, David I. Forrester¹², Michael Heym³, Václav Hurl¹³, Viktor Kurylyak¹⁴, Magnus Löf¹⁰, Fabio Lombardi¹⁵, Ekaterina Madrickiene⁸, Bratislav Matović¹⁶, Frits Mohren¹⁷, Renzo Motta¹⁸, Jan den Ouden¹⁷, Maciej Pach¹⁹, Quentin Ponette²⁰, Gerhard Schütze³, Jerzy Skrzyszewski¹⁹, Vit Sramek²¹, Hubert Sterba²², Dejan Stojanović¹⁶, Miroslav Svoboda²³, Tzvetan M. Zlatanov²⁴ and Andrés Bravo-Oviedo^{1,2}

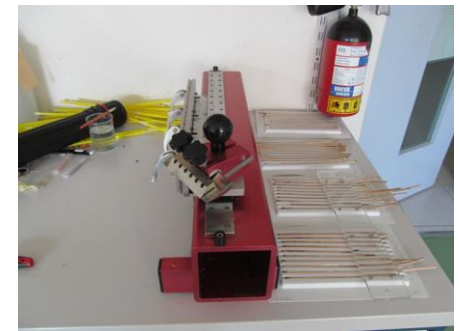


Methods

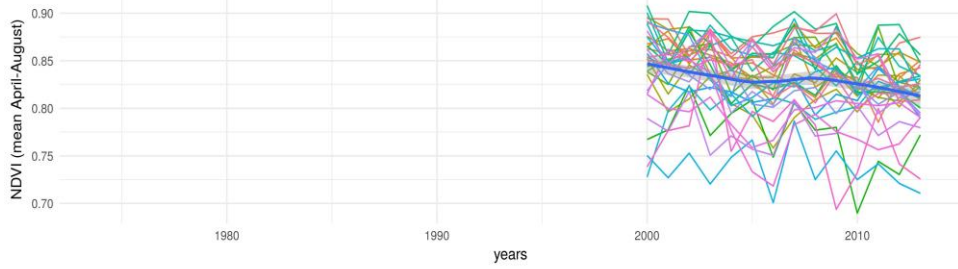
- Each of 32 localities has population of 15-20 sampled trees for dendrochronological analysis.
- Bootstrapping correlation
- R (*treeclim* and *bootRes* packages for correlation analysis, *ggplot2* for visualization)



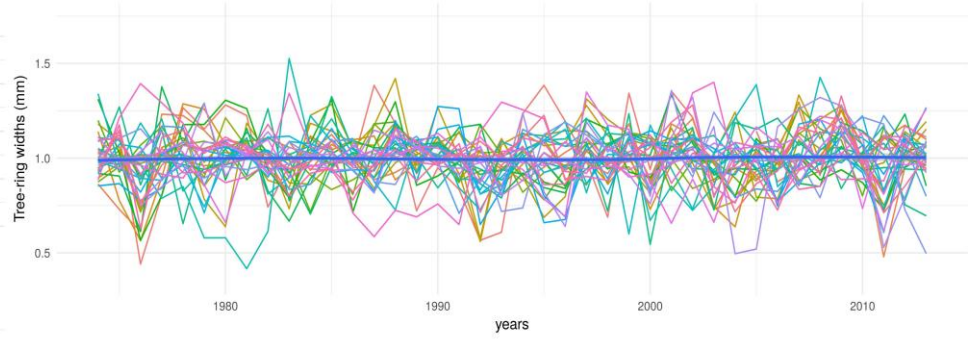
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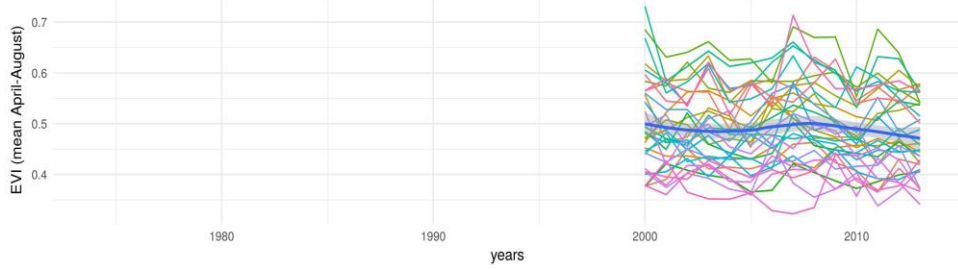
MODIS NDVI - European beech (*Fagus sylvatica*)



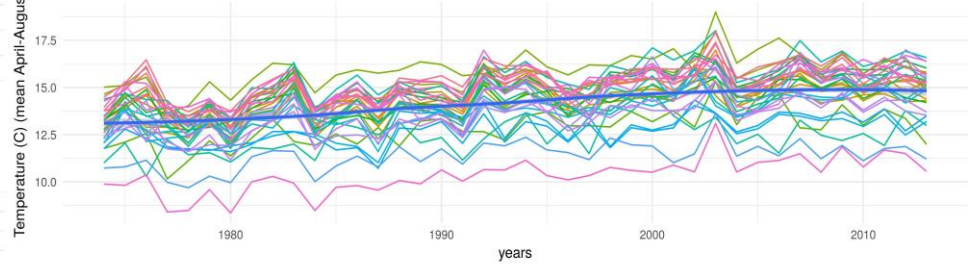
Raw tree-ring widths - European beech (*Fagus sylvatica*)



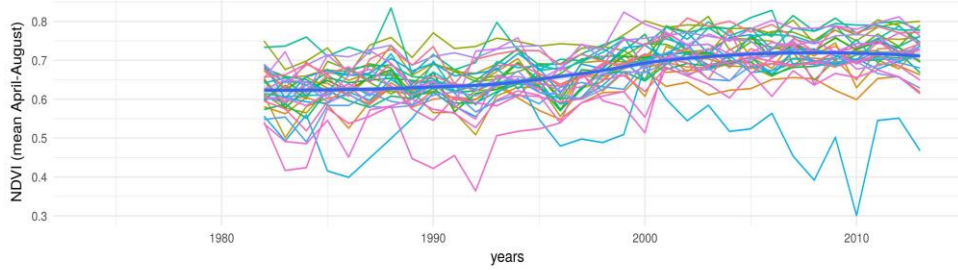
MODIS EVI - European beech (*Fagus sylvatica*)



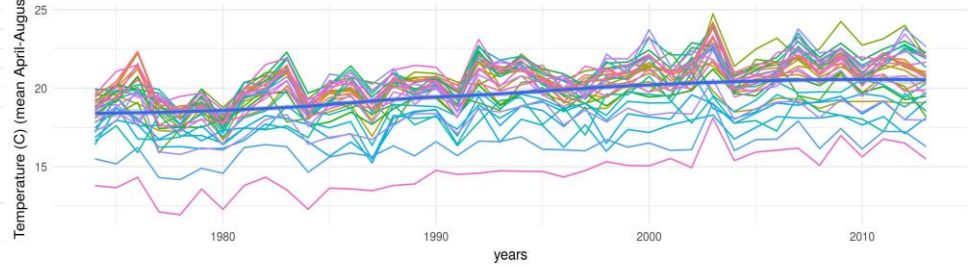
Mean temperature (E-OBS database) - European beech (*Fagus sylvatica*)



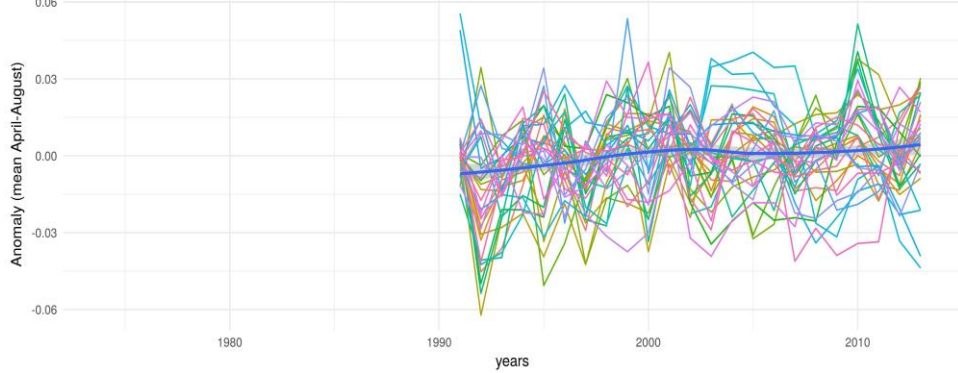
AVHRR NDVI - European beech (*Fagus sylvatica*)



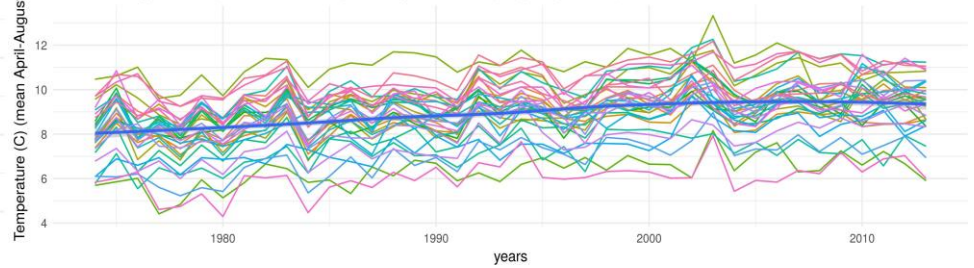
Maximal temperature (E-OBS database) - European beech (*Fagus sylvatica*)



Soil moisture anomaly (c3s database) - European beech (*Fagus sylvatica*)



Minimal temperature (E-OBS database) - European beech (*Fagus sylvatica*)



Results

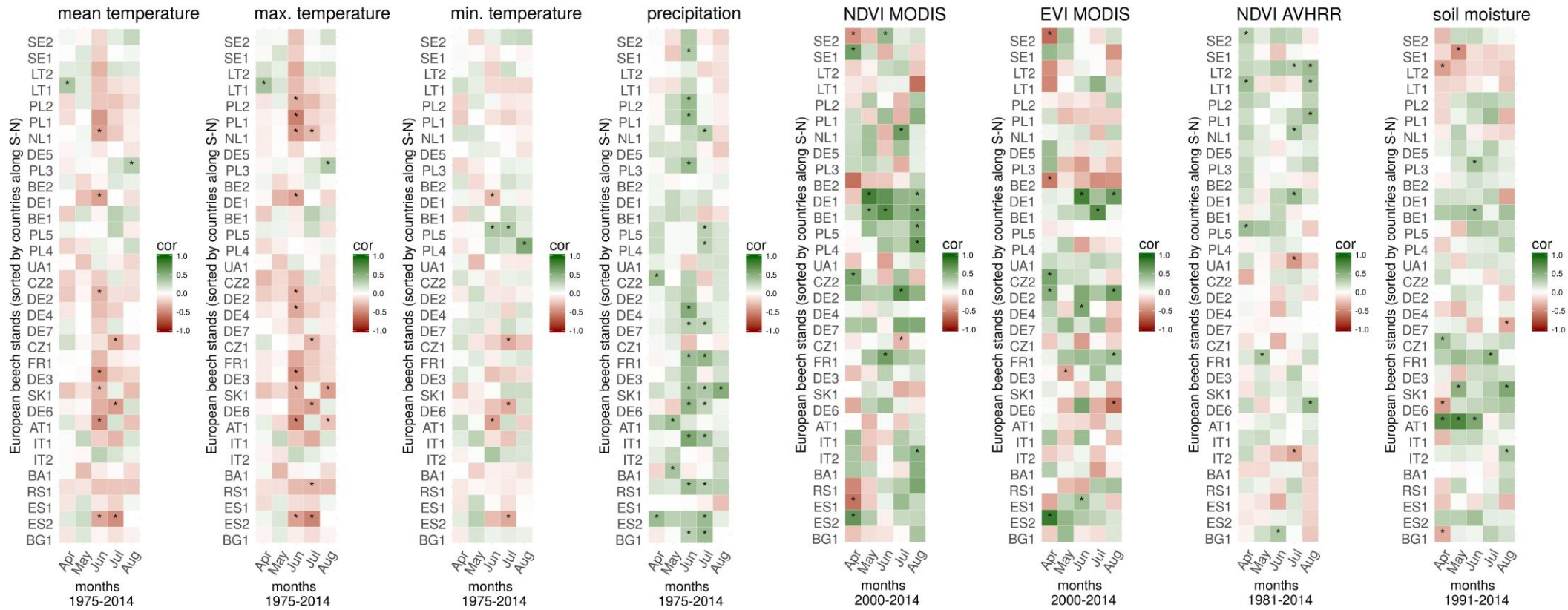
Correlation analysis: European beech vs variables

Months: April, May, June, July, August

Localities sorted S→N

Positive correlation (green) / negative (red)

Stars: significant correlation



Conclusions

Growth of European beech (32 localities across Europe) was mostly **negatively** correlated with **maximal temperatures** (high temperature → low growth) and **positively** correlated with **precipitation** (high precipitation → high growth) during growing season months.

Remotely sensed indices (NDVI and EVI can be used as proxies of growth in some cases)

