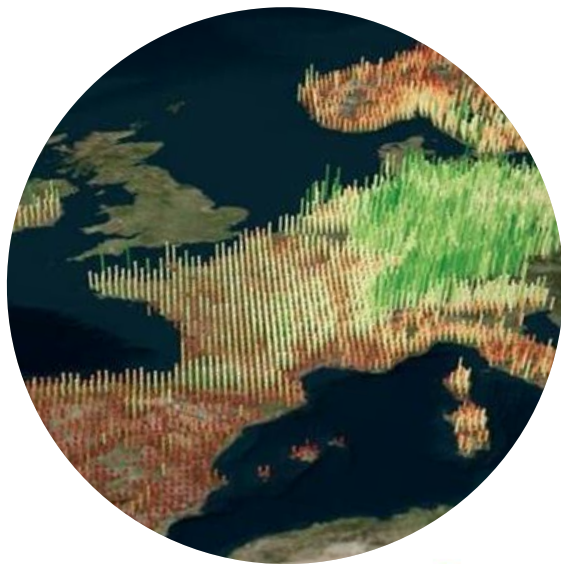


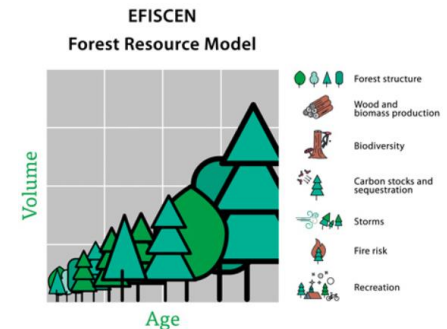
EFISCEN-Space: high-resolution modelling of forest resources at the European scale

Mart-Jan Schelhaas, Bas Lerink, Ajdin Starcevic, Geerten Hengeveld, Anjo de Jong, Igor Staritsky, Louis Konig, Joao Paulo, Sara Filipek, Mariana Hassegawa, Hans Verkerk, Janne Järviylä, Yasmin Maximo, Sergey Zudin, Gert-Jan Nabuurs



Modelling of European forest resources at Wageningen University&Research (WUR) and European Forest Institute (EFI)

- Scenario-type of analysis
- Focus on broad European trends and policies
- Management changes, carbon, biodiversity, supply/demand issues, natural disturbances, climate change impact
- Complementing national-level tools using harmonised methodology
- In cooperation with the countries
- First efforts started in 1995 (EFISCEN)



European forest projection tools

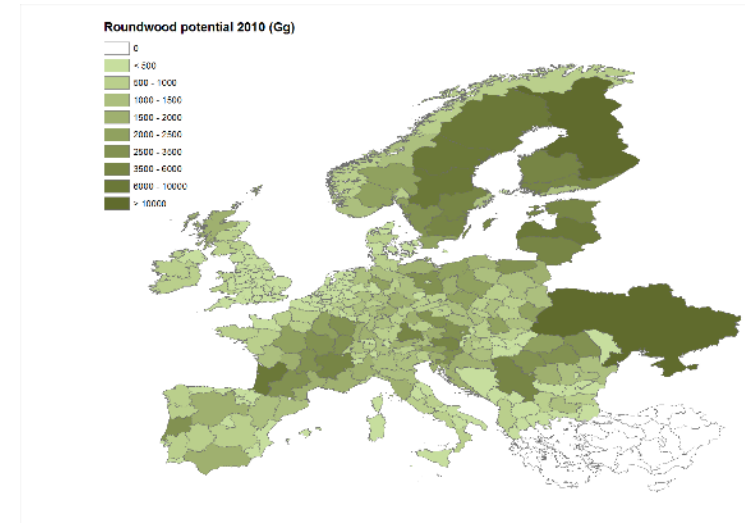
Empirically based (EFISCEN, CBM-CFS3, EFDM):

- Spatially aggregated
- Simple (even-aged management, monocultures), but robust
- Sometimes relying on (old) yield tables

Process-based (Orchidee, LPJ-Guess)

- Assume steady state
- Starting to include forest management

Hybrids

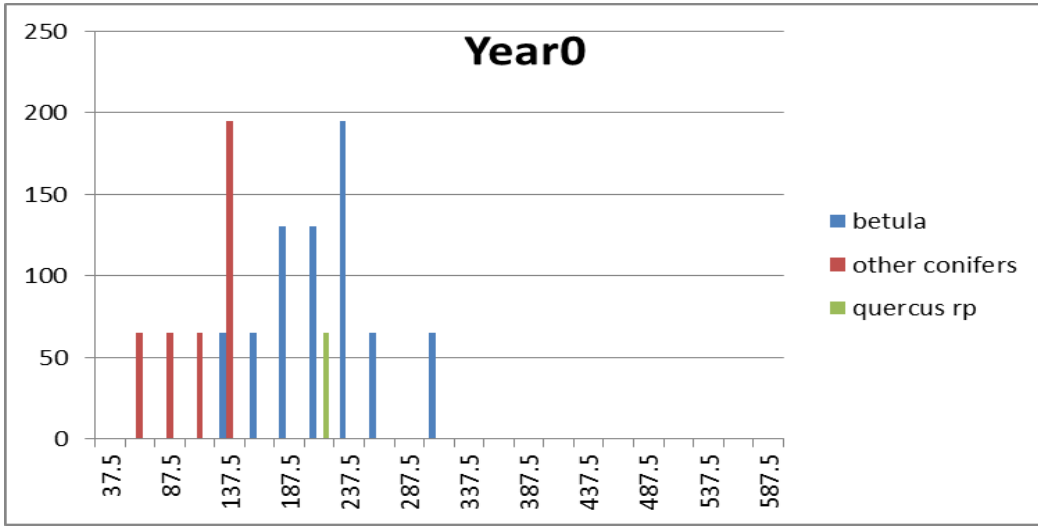


EFISCEN-Space - requirements

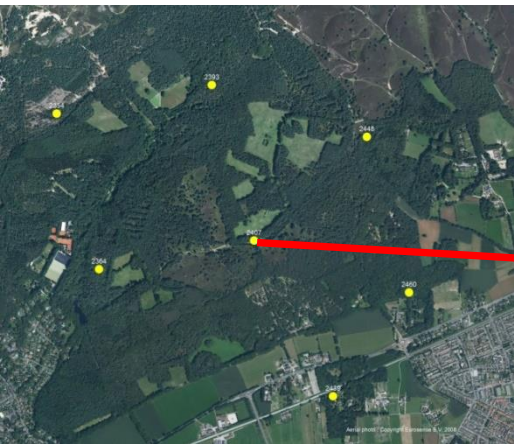
- High-resolution (~ 1 km)
- As much as possible empirically based
- Continental parameterization
- Able to deal with mixed and multi-layered forests
- Wide variety of management systems



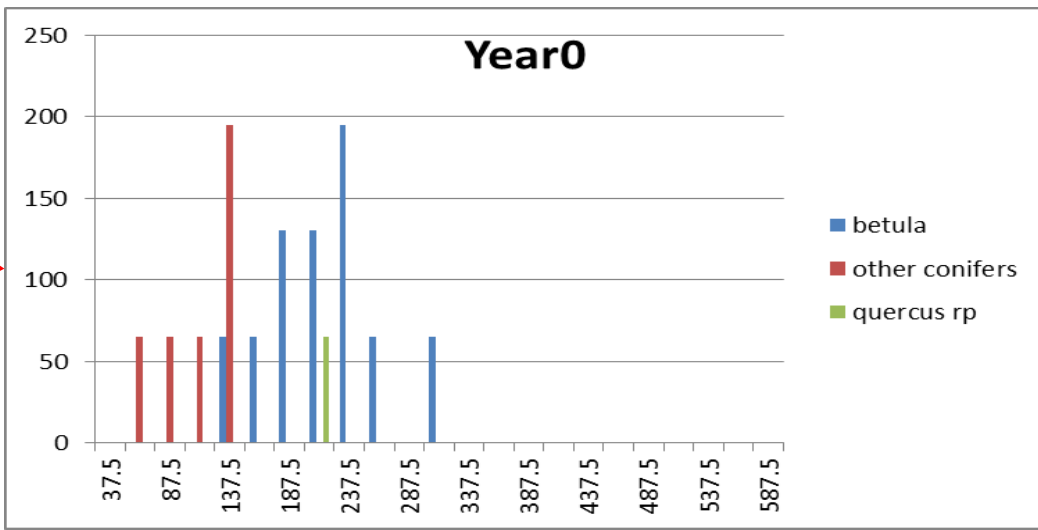
Concept: Project each NFI plot as an evolving **diameter-class distribution** over time, based on patterns derived from NFI data



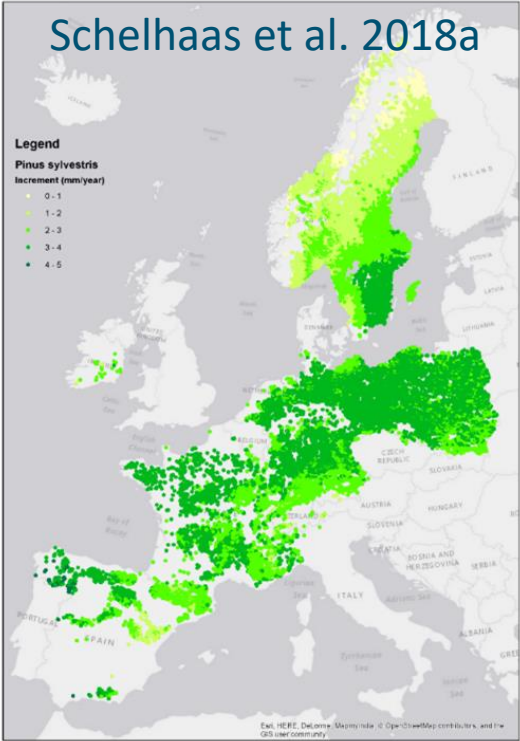
Concept: Project **each NFI plot** as an evolving diameter-class distribution over time, based on patterns derived from NFI data



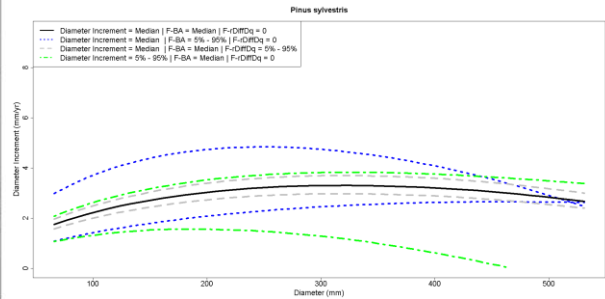
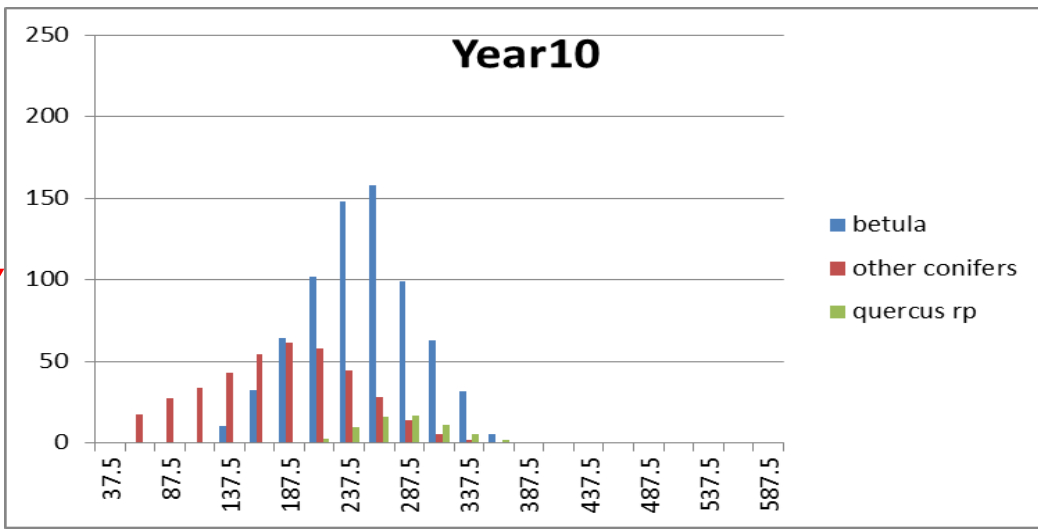
Initialisation
of a 1-ha stand



Concept: Project each NFI plot as an evolving diameter-class distribution over time, based on patterns **derived from NFI data**



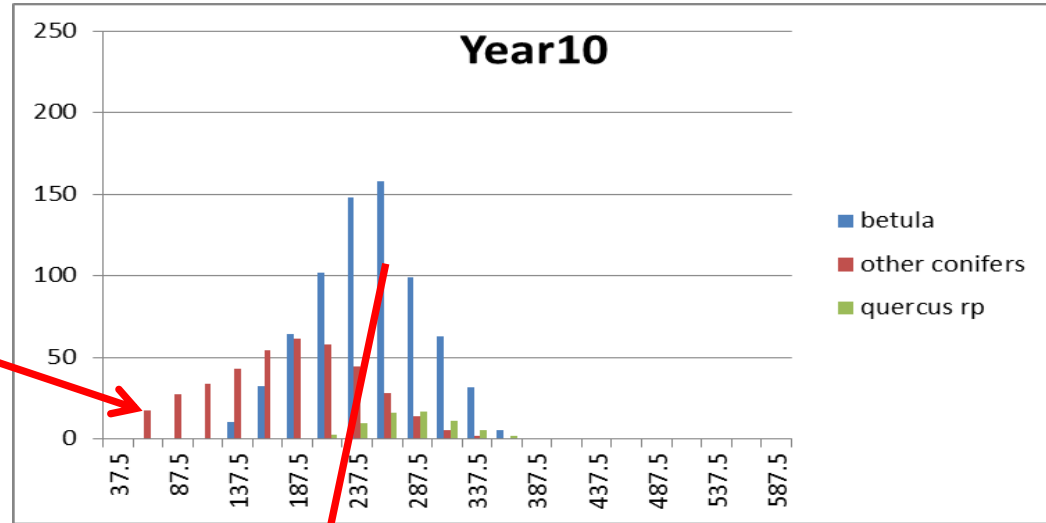
Empirical growth model



Concept: Project each NFI plot as an evolving diameter-class distribution over time, based on patterns **derived from NFI data**

Add trees

- Ingrowth
- Planting



Using empirical data/models

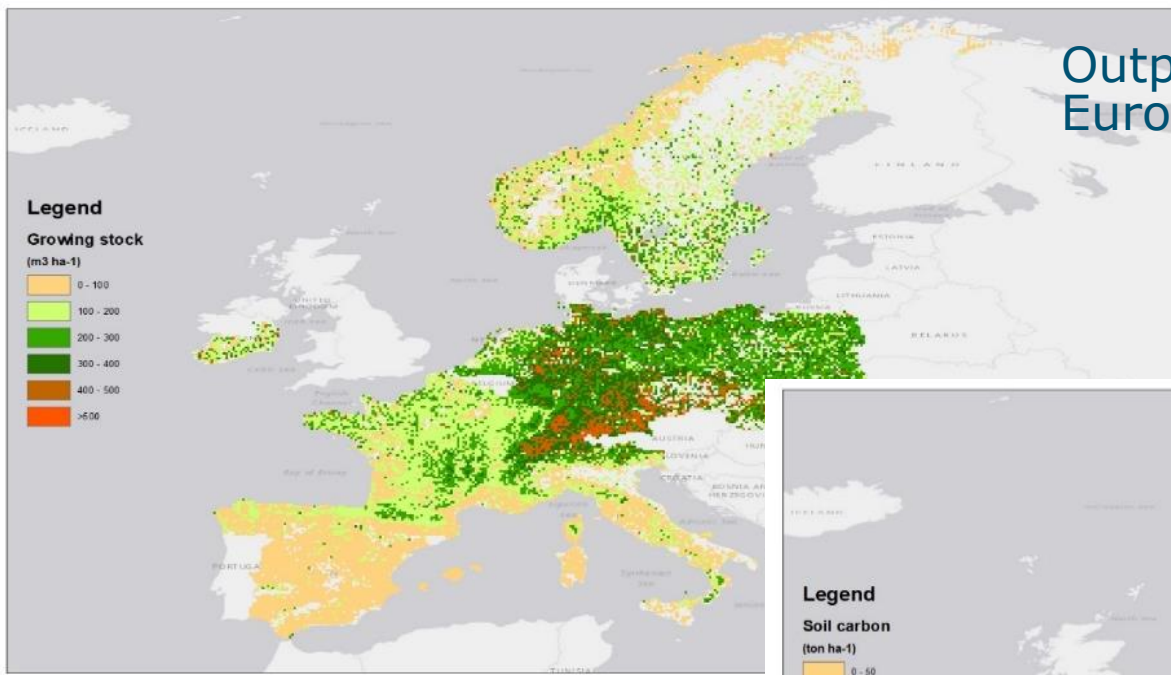
Remove trees

- Harvest
- Mortality
- Disturbances

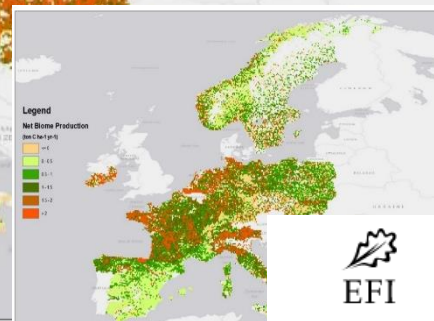
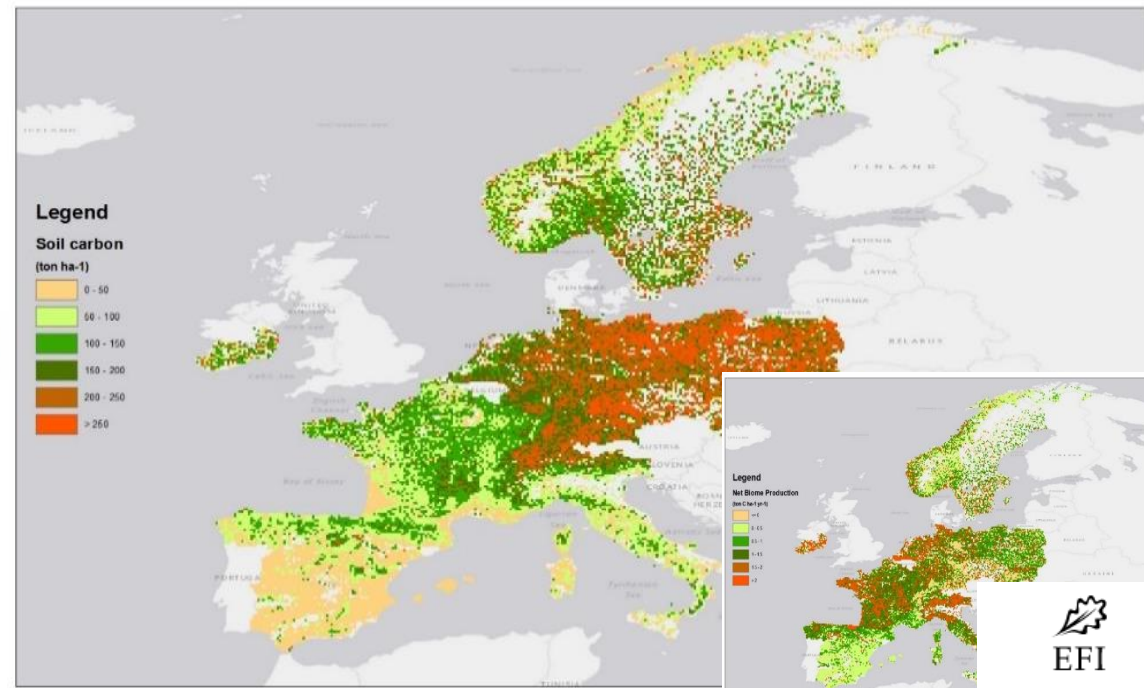
Outputs

- State, mortality, and harvest by dbh classes
- Conversions to volume, biomass, carbon
- Soil carbon estimation via litter input (YASSO15)
- Estimate of costs, revenues and labour for harvesting
- Great potential to expand (forest structure indices, deadwood, link to industry/trade model, HWP, disturbances, etc.)

Output examples, European scale



ISS-GEDI samples (first 6 months)

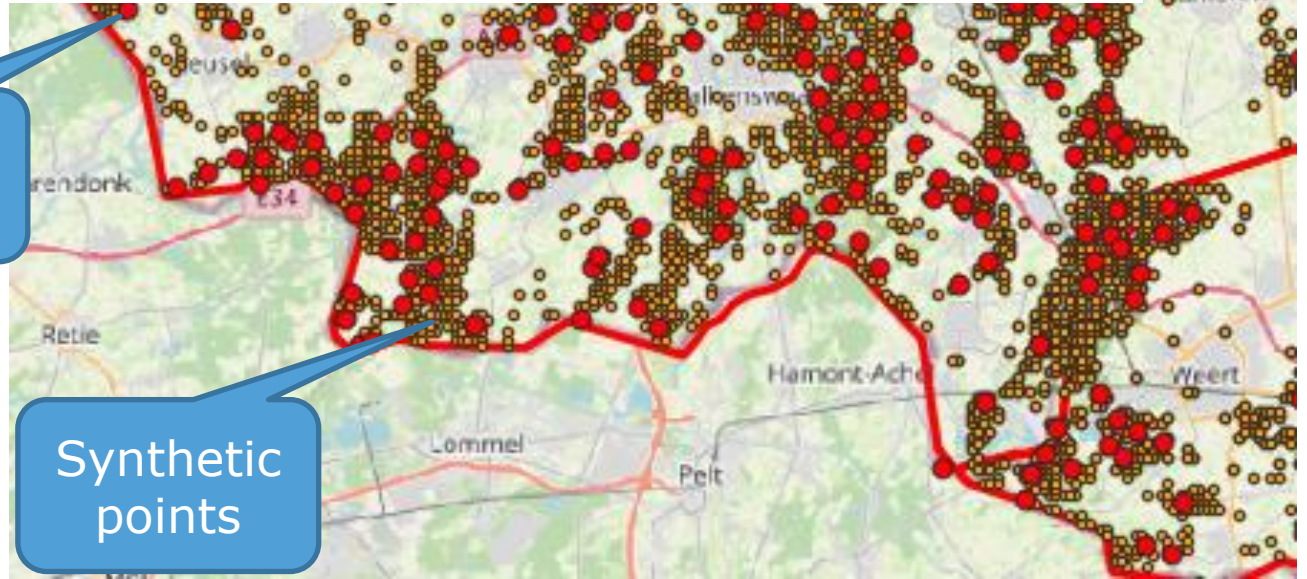


Possibility of zooming in to smaller regions, using a combination of NFI data and remote sensing products

Also provides

- Combined use of ground measurements and inventories with EO approaches is possible

disturbed regions, as identified by remote sensing



NFI point

Synthetic points



Applications

- Wood mobilisation study in 9 European regions (Lerink et al. 2023)
- Forest Reference Level for the Netherlands,
- Effect of national mitigation measures
- Forest soil carbon (HoliSoils)
- Effect of restoration measures (SUPERB)
- Options for climate-smart and biodiversity-friendly management (ForestPaths)
- Resilience of the forest-wood chain (RESONATE)
- Enhanced integration with remote sensing (FORWARDS)

Concluding words:

- We made great progress towards a new generation of EU-scale models
- In the context of LULUCF work: Allowing annual analysis, higher spatial resolution, zoom-in/quick update after disturbances
- Still many challenges ahead
- The model can be shared via an agreement
- Big thanks to all NFI crews for the fieldwork and the countries for sharing their data
- A great opportunity to study spatial patterns beyond the national data!



Thank you!

Questions:

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or ask Eric Arets in the room

