

Forest Resource Modelling in the Netherlands and Europe

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Clear need for policy support with regards to the role of forests, now and in future, at national and European scale

- Bioeconomy
- Climate change mitigation
- Biodiversity conservation
- Impact of climate change
- Protection of soil, water, infrastructure
- Provisioning of (wood) products, I
- ...



National forest projection tools

Table 3 Data inputs, simulation details, growth model type and spatial scale of the simulation tools currently used in Europe. *NFI* National Forest Inventory, *SFI* Standwise Forest Inventory, *PP* Permanent plots

Acronym	Data Inputs			Simulation			Growth module						Spatial scale						
	NFI	SFI	PP	Projection time-span (year)	Rotation		Time-step (year)	Yield table	Empirical		Process-based		Distance dependent		Climate sensitive		Stand	Landscape	Region
					One	Several			Tree	Stand	Tree	Stand	Yes	No	Yes	No			
MELA	x			30		x	5		x								x	x	x
AVVIRK2000	x			100		x	10			x							x	x	x
HUGIN	x		x	100		x	5		x					x				x	x
RegWise	x		x	100		x	5		x					x				x	x
DK Simulator	x			100-500		x	1	x						x					x
Icelandic Simulator	x			120		x	1		x					x				x	x
FORECAST		x		80		x	1	x		x				x					x
ForGEM	x			20-30			Month				x			x					x
EFISCEN	x			50-60		x	5			x				x					x
PROGNAUS	x			10-200			5		x					x				x	x
CALDIS	x			10-200			1		x					x				x	x
Matrix Age-class	x			20-30		x	1			x				x					x
Matrix Diameter-class	x			20-30		x	1-5		x					x					x
WEHAM	x			40		x	5		x					x					x
MASSIMO	x		x	100		x	10		x					x					x
KUPOLIS	x	x		100		x	1-20			x				x				x	x
SIMPLOT	x			100		x	1		x	x				x					x

European forest projection tools

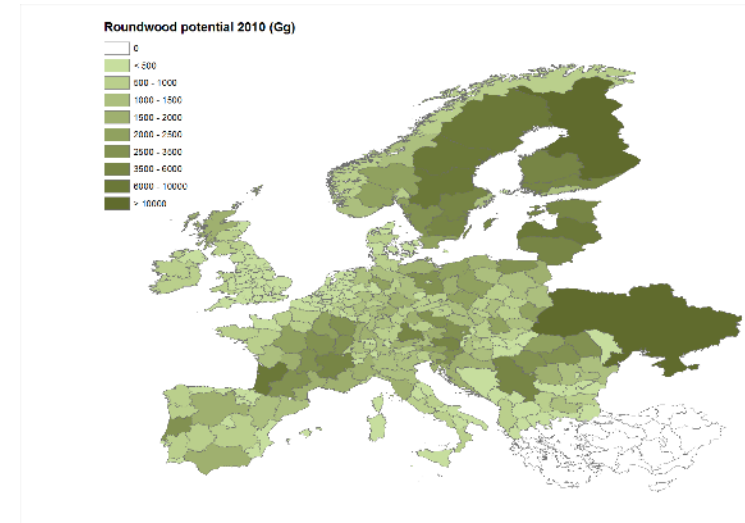
Empirically based (EFISCEN, CBM-CFS3, EFDM):

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

Process-based (Orchidee, LPJ-Guess)

- Assume steady state
- Only starting to include forest management

Hybrids



Combine these approaches: EFISCEN Space

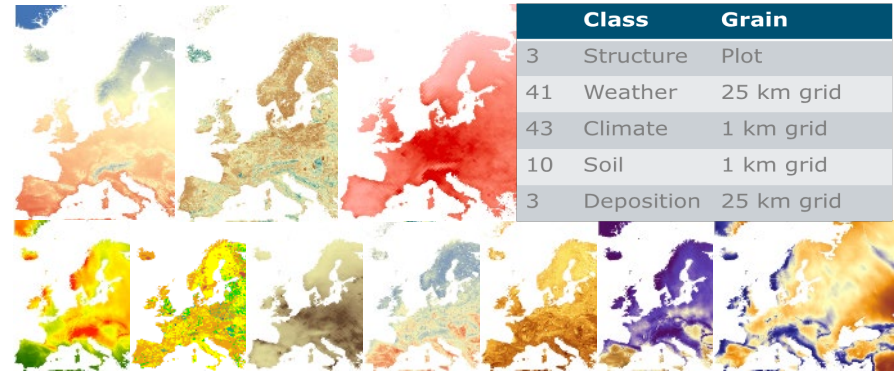
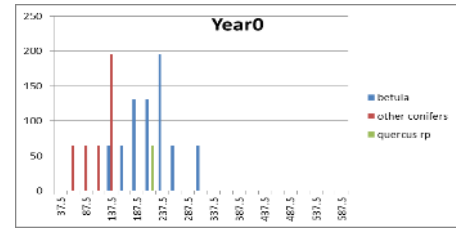
- Empirically based
- Continental parameterisation
- Able to deal with mixed and multi-layered stands
- Spatially explicit/higher resolution

Approach:

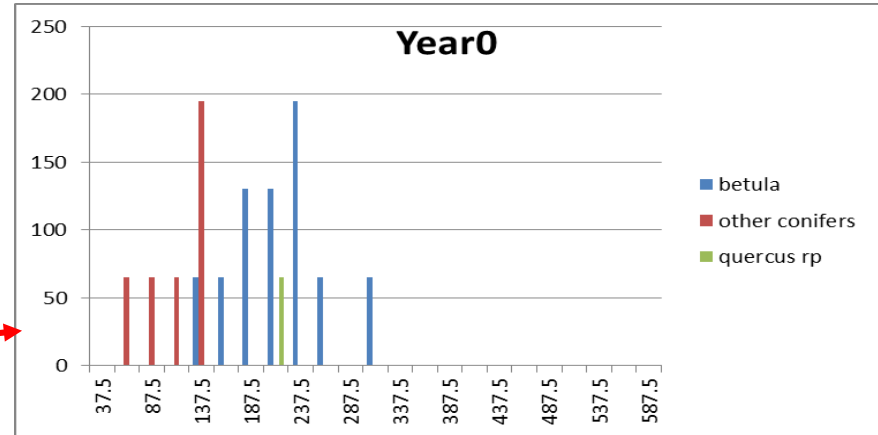
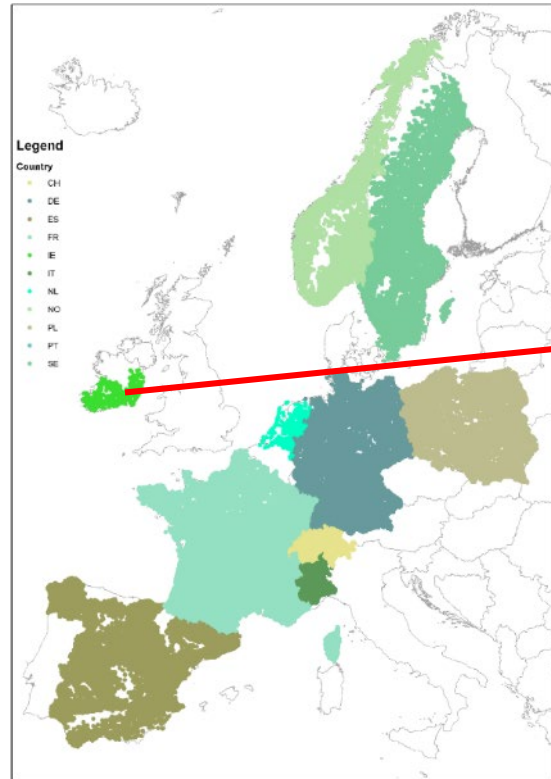
- Model diameter distribution of (NFI) plots over time

Needed:

- Tree-wise observations from NFIs
- A set of explanatory variables

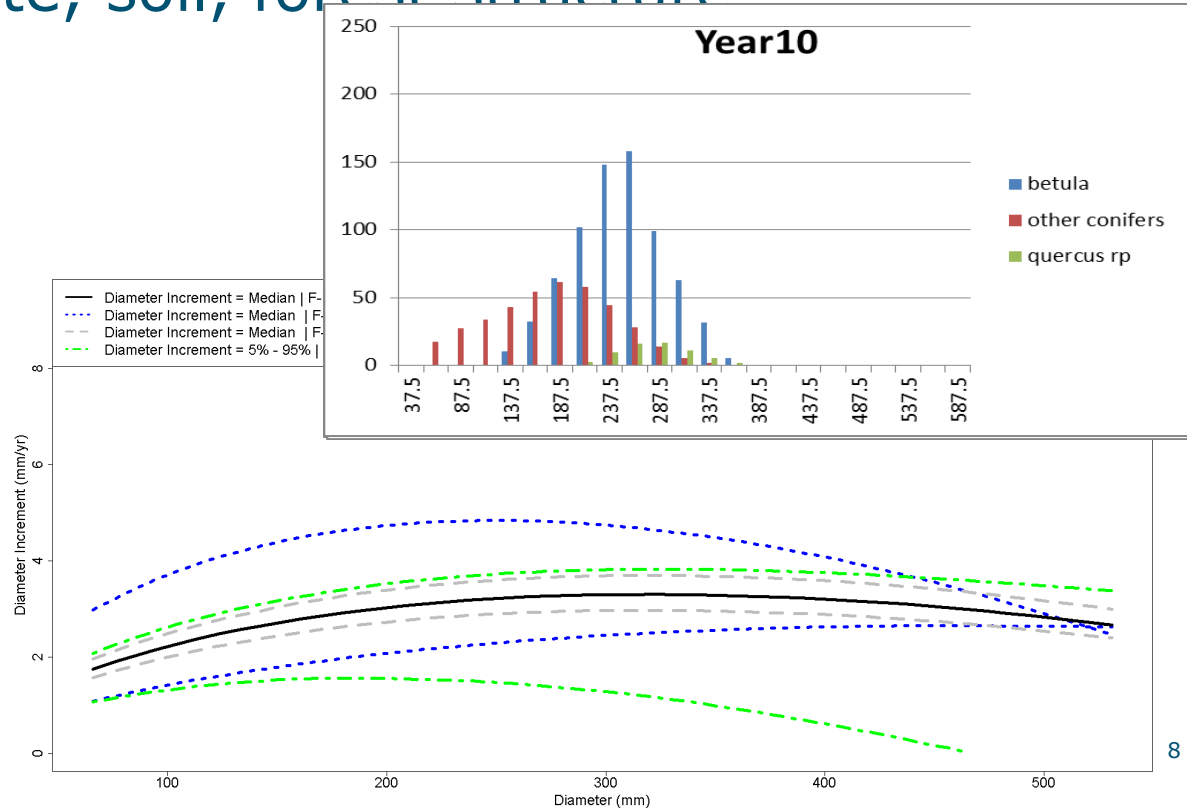
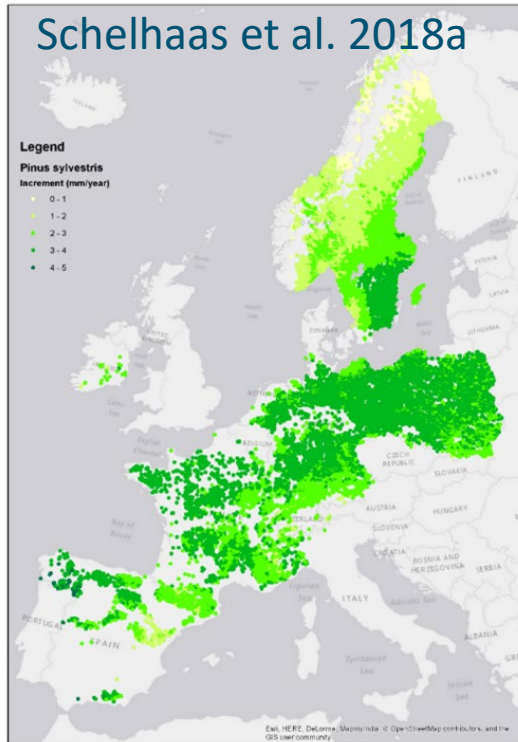


Initialisation based on NFI plot data

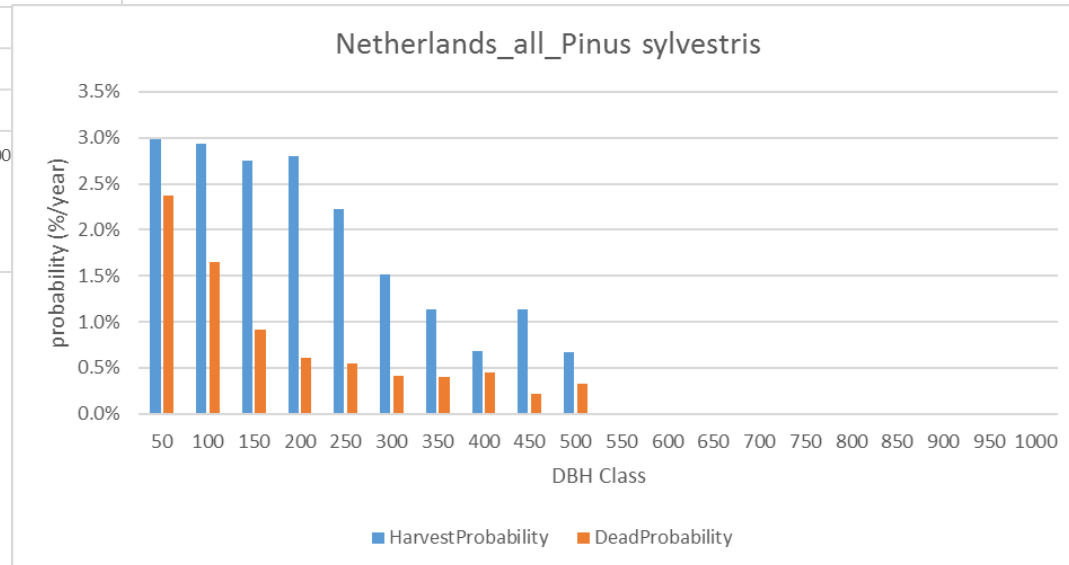
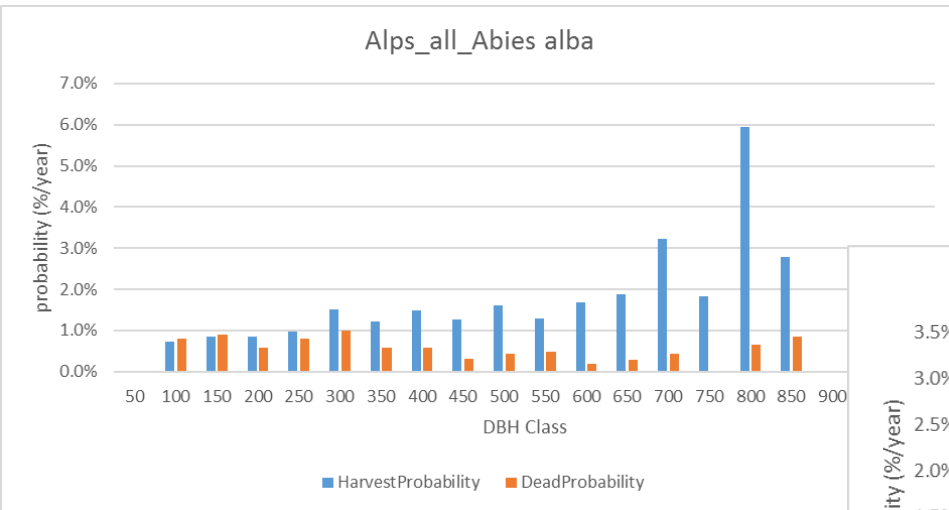


- Number of trees by diameter class
- for 20 species (groups)

Annual time step: transition to higher dbh class based on European wide increment functions, sensitive to climate, soil, forest structure



Management: based on patterns observed on repeated NFI plots



Outputs

- State, mortality and harvest by dbh classes
- Regional conversion to volume using simple equations derived from NFI data
- Estimate of costs, revenues and labour for harvesting
- Great potential to expand (forest structure indices, biomass, carbon, deadwood, etc.)
- Successfully applied in wood mobilisation study in 9 European regions, Forest Reference Level for the Netherlands, effect of national mitigation measures

Conclusion

- We made great progress towards a new generation of EU-scale models
- Still many challenges ahead
- A great opportunity to study spatial patterns beyond the national data!
- Uncertain how far east we can go with current data
- Can work on all types of data sources that deliver initial diameter distributions (NFI, stand-wise inventories)

Thank you!

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- Simwood project
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- NFIs from all countries
- Field crews

