



facilitated by EFI

Integrate Network: what is a Marteloscope?

Andreas Schuck
European Forest Institute

Explaining marteloscopes

- Term derived from French: refers to a more detailed examination of tree selections
- Usually 1 ha rectangular sites
- Trees are mapped, numbered and recorded

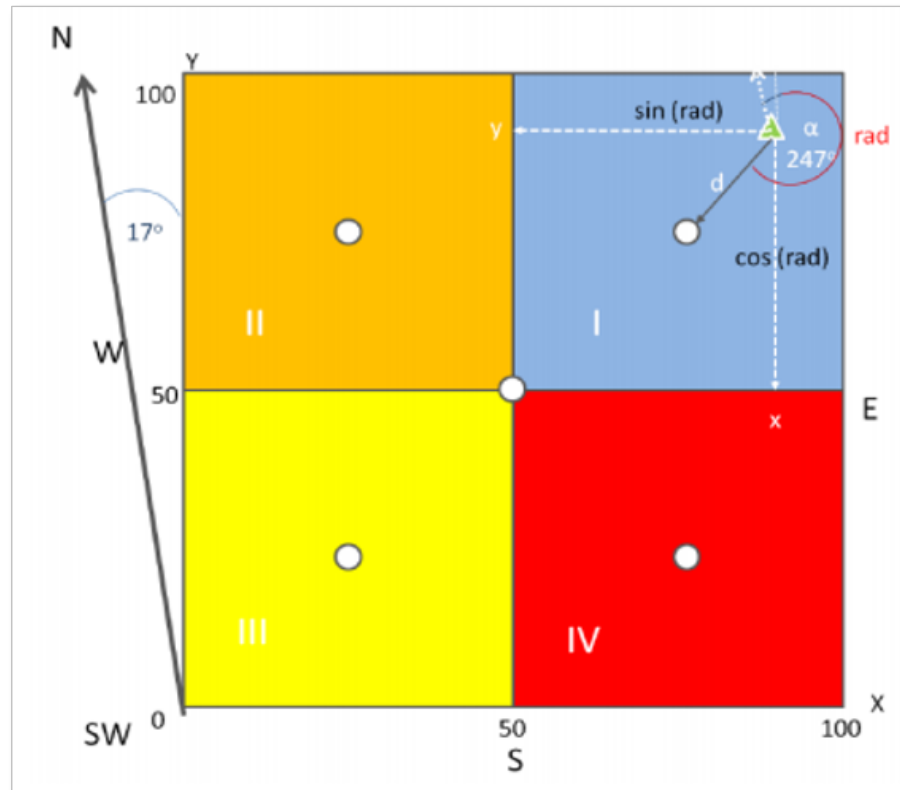


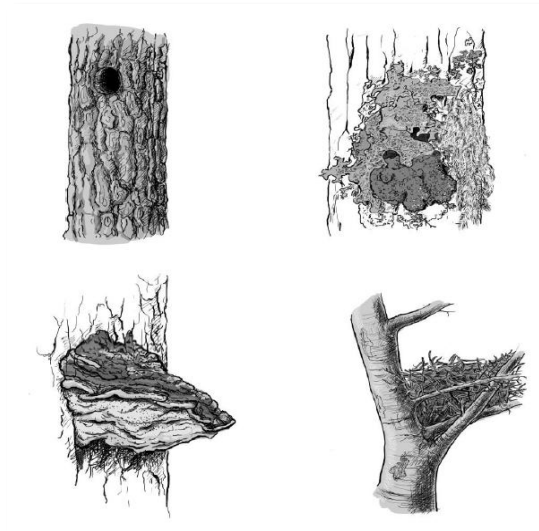
Photo Andreas Schuck

What data is collected?

Type	Unit
Tree species	Fagus sylvatica (Fasy), Abies alba (Abal) etc.
Tree location*	polar coordinates
Tree status	dead (0), alive (1)
Diameter at breast height	dbh [cm] (>7.5 cm)
Tree height	h [m]
Crown base height	h_{cb} [m]
Timber quality	Class (A, B, C, D/IT, F for fuelwood) and section length [m]
TreMs	abundance

*Note: additional data can be collected for certain training needs, e.g, regeneration, forest protection

Kraus et.al., 2016



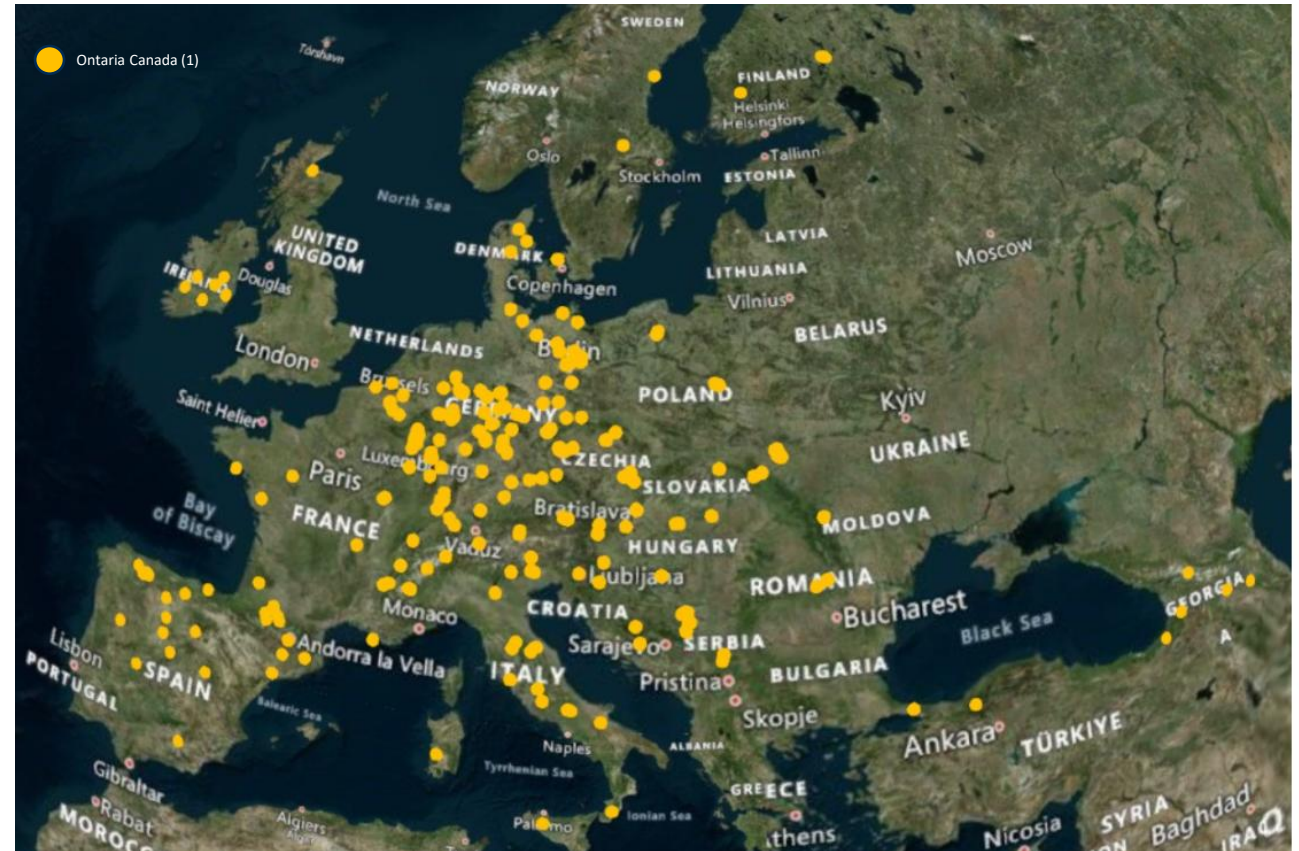
Kraus et.al., 2016



Photo: Andreas Schuck

Demonstration site network

- Marteloscopes as forest demonstration and learning sites with emphasis on integrating nature conservation in managed forests
- Currently there are nearly 300 sites in 28 countries across Europe with one in Canada



Taken from: jplus.efi.int

Wide variety of site types and management regimes



Photos: local marteloscope managers

Martelsocopes as outdoor training / learning sites



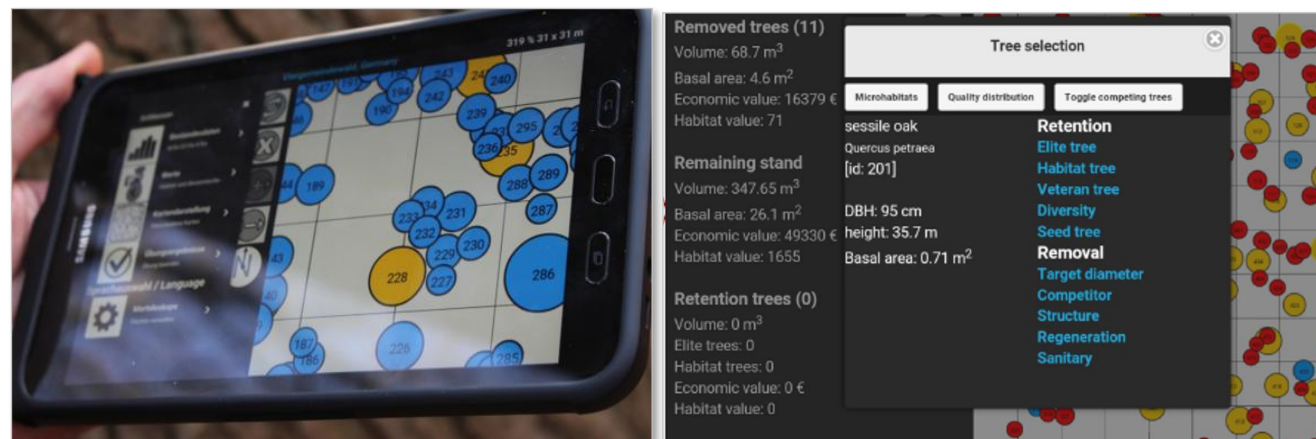
- Training exercises can be tailored to topics and/or target groups
- Exercises are performed with a software running on mobile devices („I+“ Software package)
- Results of a virtual intervention can be retrieved directly
- Discussion of virtual intervention results is at the heart of training exercises



Conducting a marteloscope exercise - steps



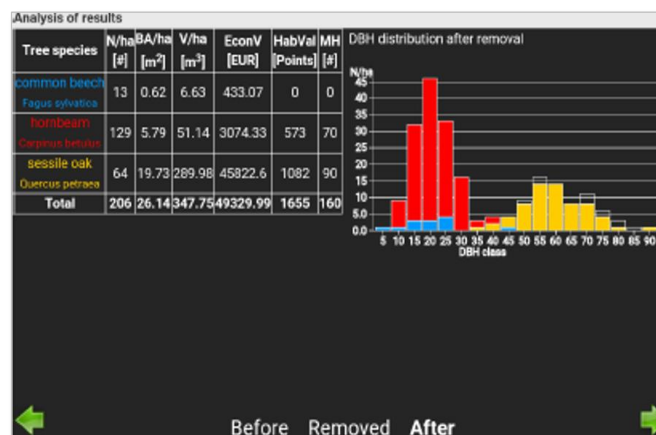
Introducing the forest site, martelosopes and the task



Explaining the use of the I+ software for performing virtual interventions



Conducting the exercise in small groups



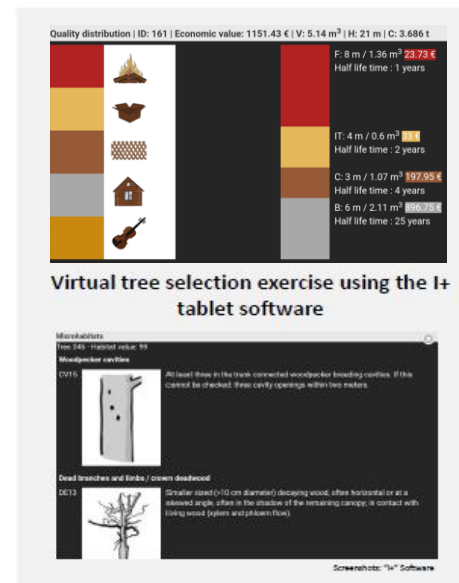
Retrieving the results



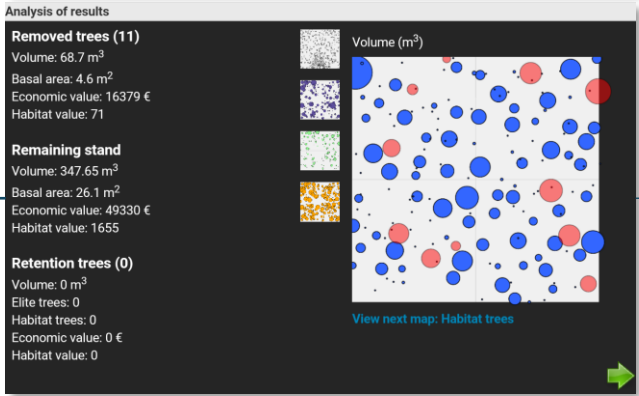
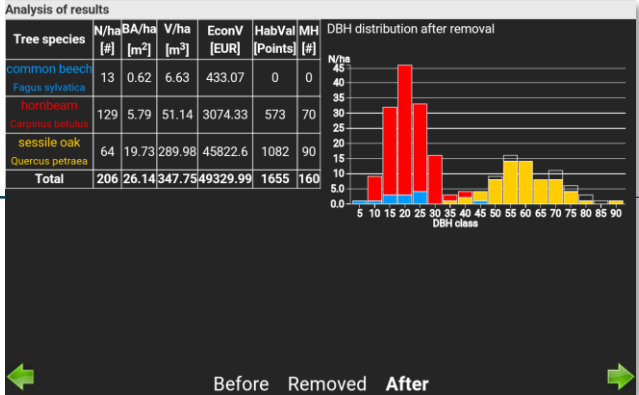
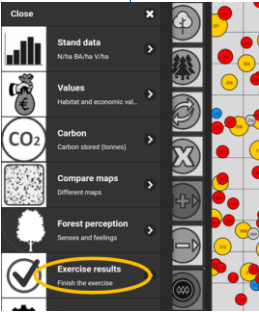
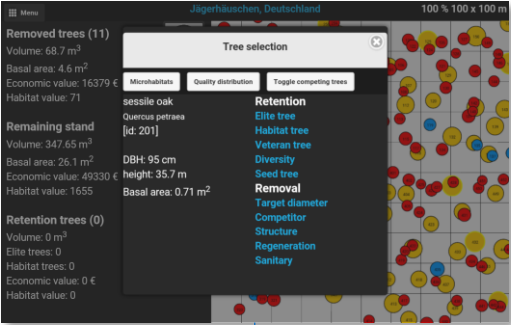
Jointly discussing the results of the different groups

Example exercise

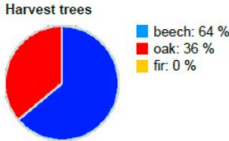
“remove 60m³ of wood, limit the number of trees you remove while selecting 25% high quality timber, and identify a minimum of 5 habitat trees for retention”



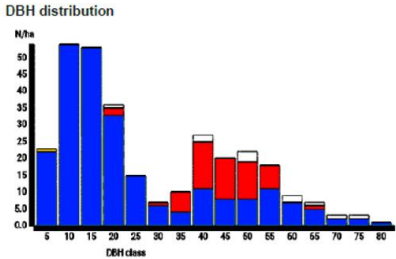
Exercise results



Volume: 49.0 m³
Basal area: 2.9 m²
Economic value: 4431 EUR
Habitat score: 557



Remaining stand
Volume: 402.76 m³
Basal area: 28.4 m²
Economic value: 38159 EUR
Habitat score: 8133



Retention trees
Volume: 47.52 m³
Elite trees: 0
Habitat trees: 11
Economic value: 3739 EUR
Habitat score: 692

Analysis per species

Tree species	N/ha [#]	BA/ha [m²]	V/ha [m³]	Econ [EUR]	Habitat [Points]	TREMs [#]
beech	242	18.91	263.39	18354.1	6213	6213
fir	1	0	0	0.12	0	0
oak	54	9.45	139.4	19804.69	1920	1920
Total	297	28.37	402.79	38158.9	8133	8133

Training - further examples

Instructor can tailor training tasks to one or more topics and/or target groups

- Removal of a pre-defined volume, basal area
- Maintain or reach a pre-defined diameter distribution
- Address trade-offs between different ecosystem services
- Address topics such as regeneration, deadwood or carbon stocks
- Identify a set number of habitat trees and tree microhabitats
- Learning about forest ecosystems and their value for society
- Other training tasks (also more comprehensive)

Field visits and training events



Forest extension network visits marteloscope in Bonn, Germany



Outdoor forest training in Irish marteloscope sites



Silviculture trainers using martelosopes in education of forest managers and private forest owners (*)



Establishing a Network of Martelosopes in Western Ukraine



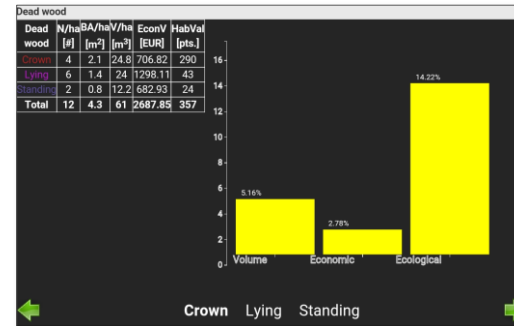
Successful premiere in the marteloscope teaching and learning site in Tharandt Forest (University Dresden)



School visit in a marteloscope site

I+ training software – new modules – new training options

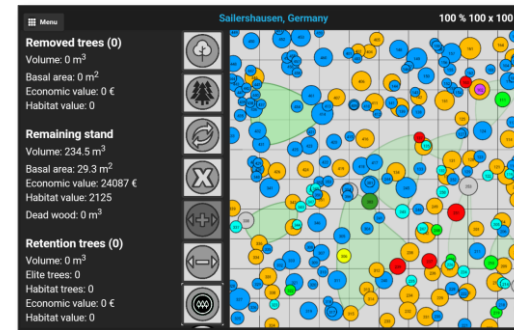
Deadwood



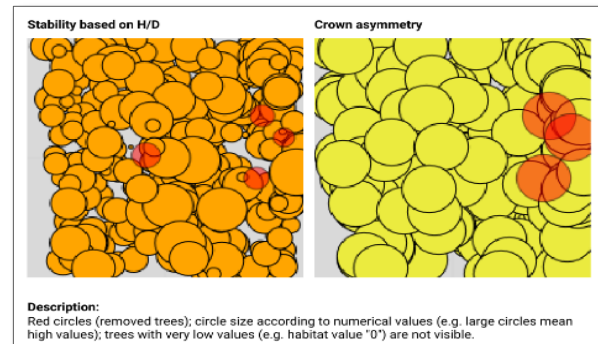
Stand development (20 years)



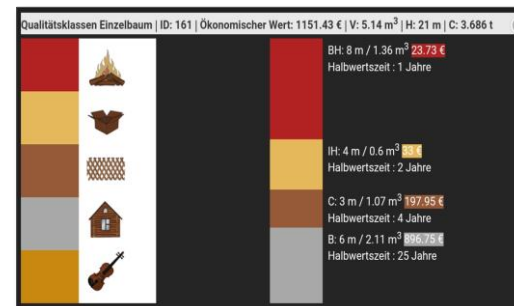
Regeneration



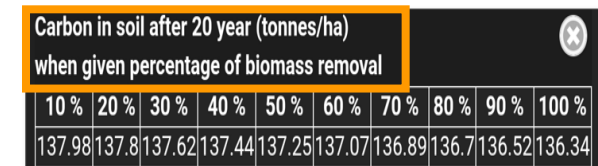
Forest protection (steep slopes)



Carbon (woody biomass)



Soil carbon



Further modules under development: forest genetics; Index of biodiversity Potential (IBP)

Concluding remarks

- Sites have shown to be a powerful tool for training, education, knowledge sharing and communication
- They allow for on-site exchange and fact-based discussions as the results of virtual interventions are readily available
- Martelscopes have found application in silvicultural training curricula
- There is increased interest from secondary schools
- Continuous feedback from training exercises results in further tool development
- Martelscope dataset is showing increasing value for research
- Martelscope and software tools are being more and more applied and further developed in projects
- Interest in martelscopes and the tools is shown also from regions outside Europe



Thank you

andreas.schuck@efi.int

<https://integratenetwork.org/>

<http://iplus.efi.int/>