
AFRICA
ENFORCE
museum

WOOD IDENTIFICATION METHODS

- Example expertise









WOOD IDENTIFICATION METHODS



- Any identification method has one big bottleneck: reference specimens!
- But in Belgium we have the **Tervuren Xylarium**
- 81000+ specimens, 13000+ woody species

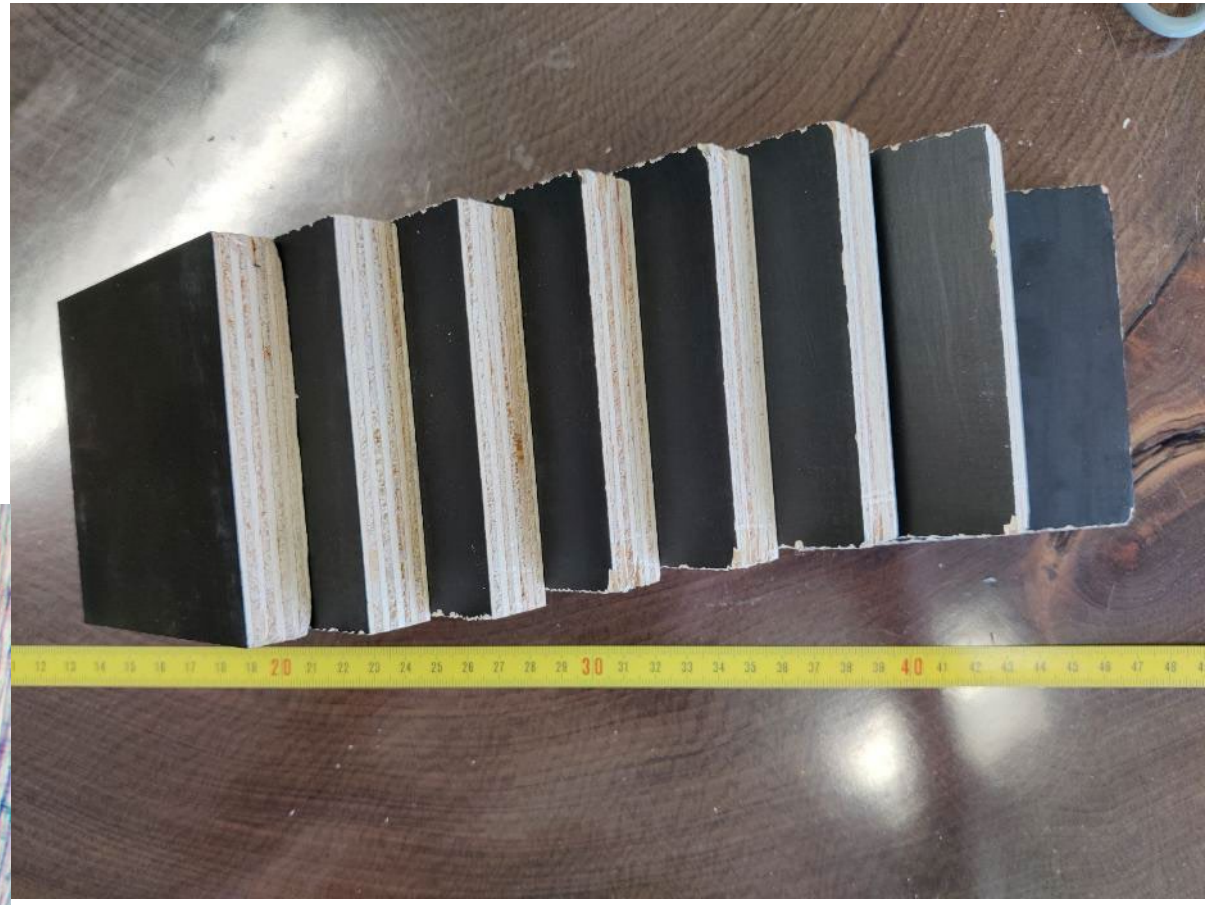


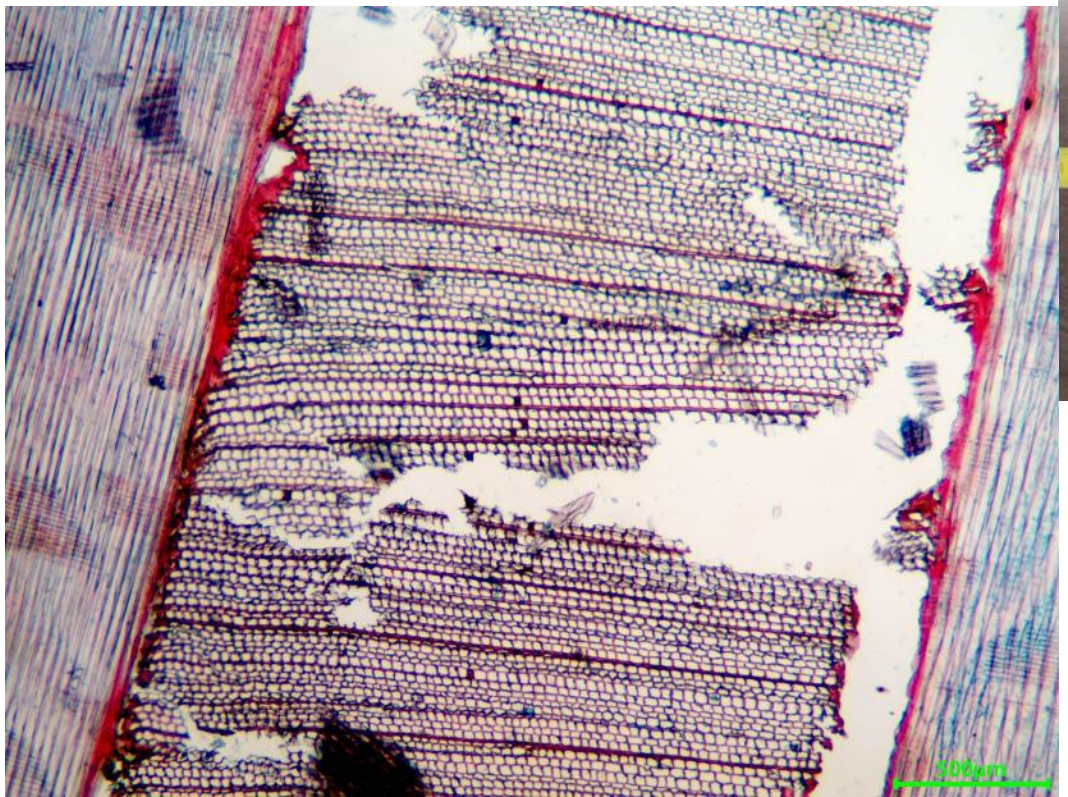




WOOD IDENTIFICATION METHODS

- Wood anatomy (lab)
- Question: open determination
- Result: *Pinus* cfr. *radiata* & *Cunninghamia lanceolata*



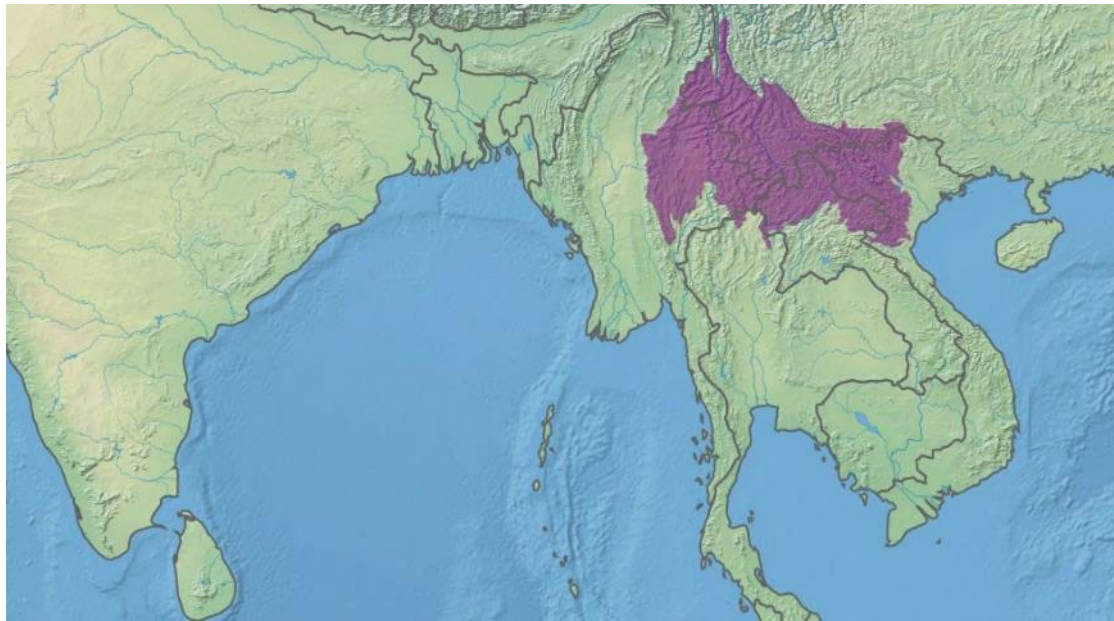


WOOD IDENTIFICATION METHODS

- Wood anatomy (lab)
- Question: verify Chinese species of *Picea*
- Result: risk of imported deforestation

Code	Family	Genus	Species
exp_434_1	*Pinaceae*	*Pinus**	spp.
exp_434_2	*Pinaceae*	*Pinus**	spp.
exp_434_3	*Symplocaceae*	*Symplocos*	spp.
exp_434_4	*Lauraceae*	cfr. *Machilus*	spp.
exp_434_5	*Viburnaceae*	*Viburnum*	spp.
exp_434_6	*Lauraceae*	cfr. *Machilus*	spp.
exp_434_7	*Theaceae*	*Schima*	cfr. *crenata*
exp_434_8	*Fagaceae*	*Castanopsis*	spp.
exp_434_9	*Fagaceae*	*Castanopsis*	spp.
exp_434_10	*Fagaceae*	*Castanopsis*	spp.
exp_434_11	*Fagaceae*	*Quercus*	spp.
exp_434_12	*Juglandaceae*	*Engelhardia*	spp.
exp_434_13	*Theaceae*	cfr. *Schima*	spp.





WOOD IDENTIFICATION METHODS

- Wood anatomy (lab)
- Question: verify *Pinus* & *Populus*
- Result: *Pinus*, *Canarium* & *Acacia*





WOOD IDENTIFICATION METHODS

- Wood anatomy (lab)
- Question: open determination
- Result: *Senegalia/Vachellia, Colophospermum mopane, Spirostachys africana*







Onderzoek

In België barbecueën we met houtskool uit Namibië

27 augustus 2026 door Jan Walraven



(Foto bos: CC BY-SA 4.0 GIZ Bush Control and Biomass Utilisation Project (Wikimedia Commons))

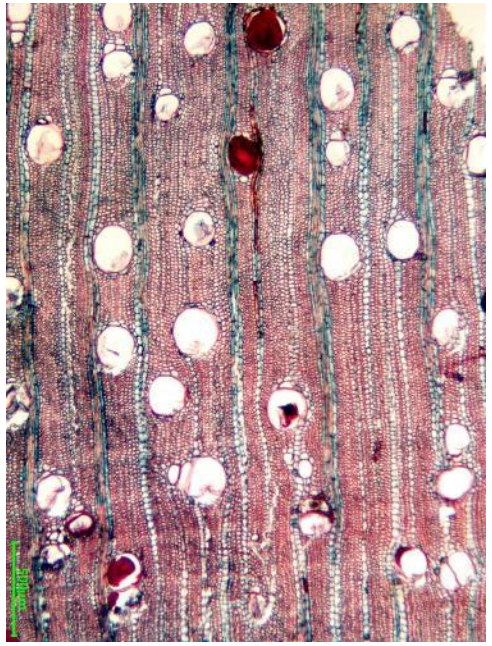
WOOD IDENTIFICATION METHODS

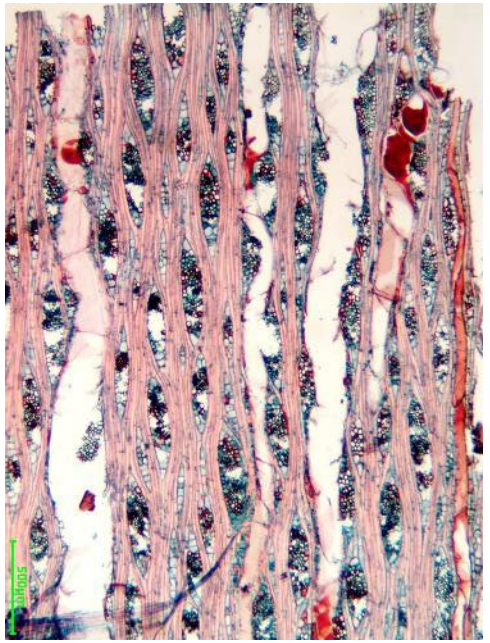
- Wood anatomy (lab)
- Question: verify sipo (*Entandrophragma utile*)
- Result: *Khaya* sp.

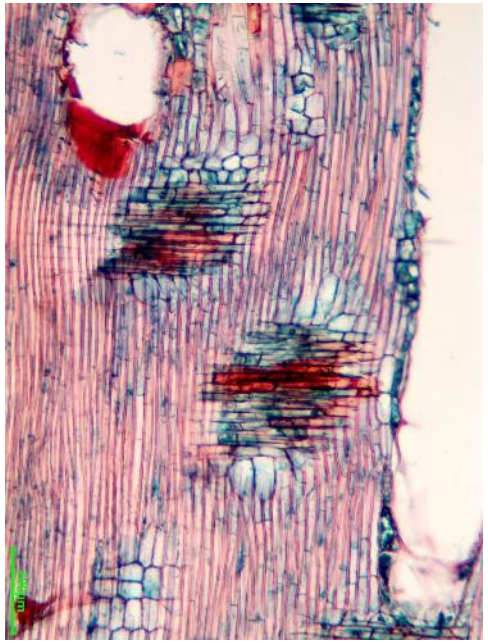






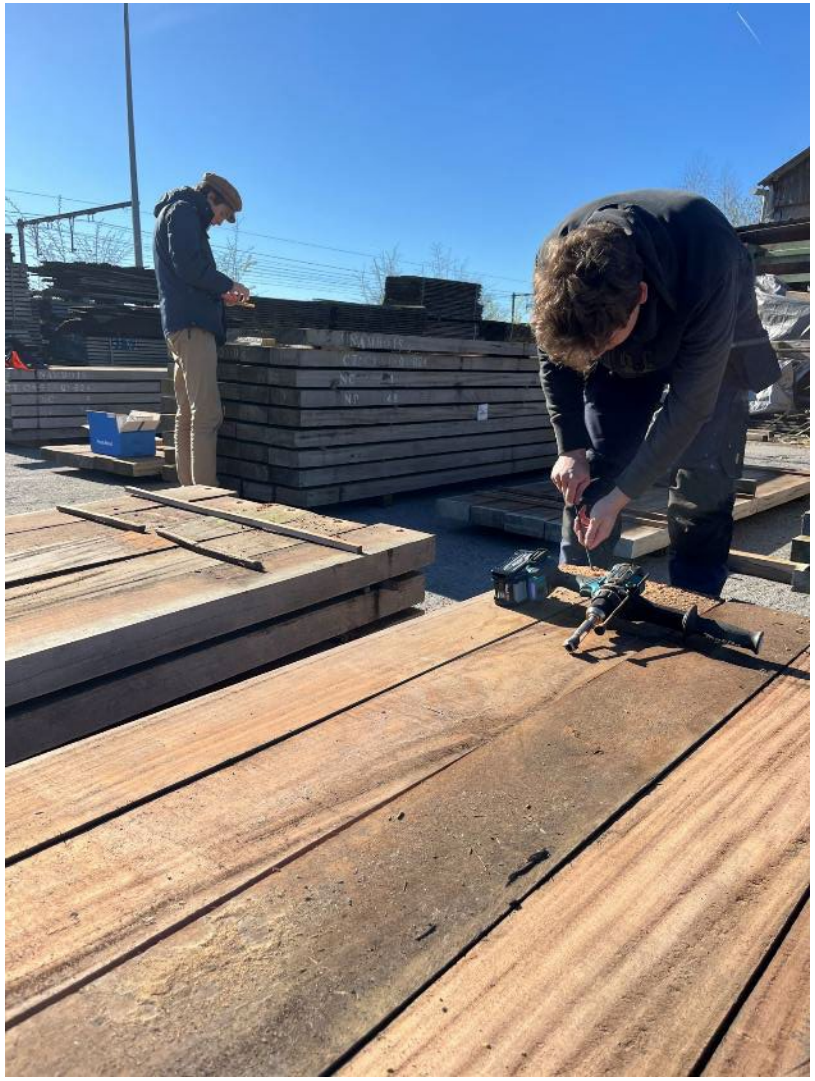






WOOD IDENTIFICATION METHODS

- Wood anatomy (in the field)

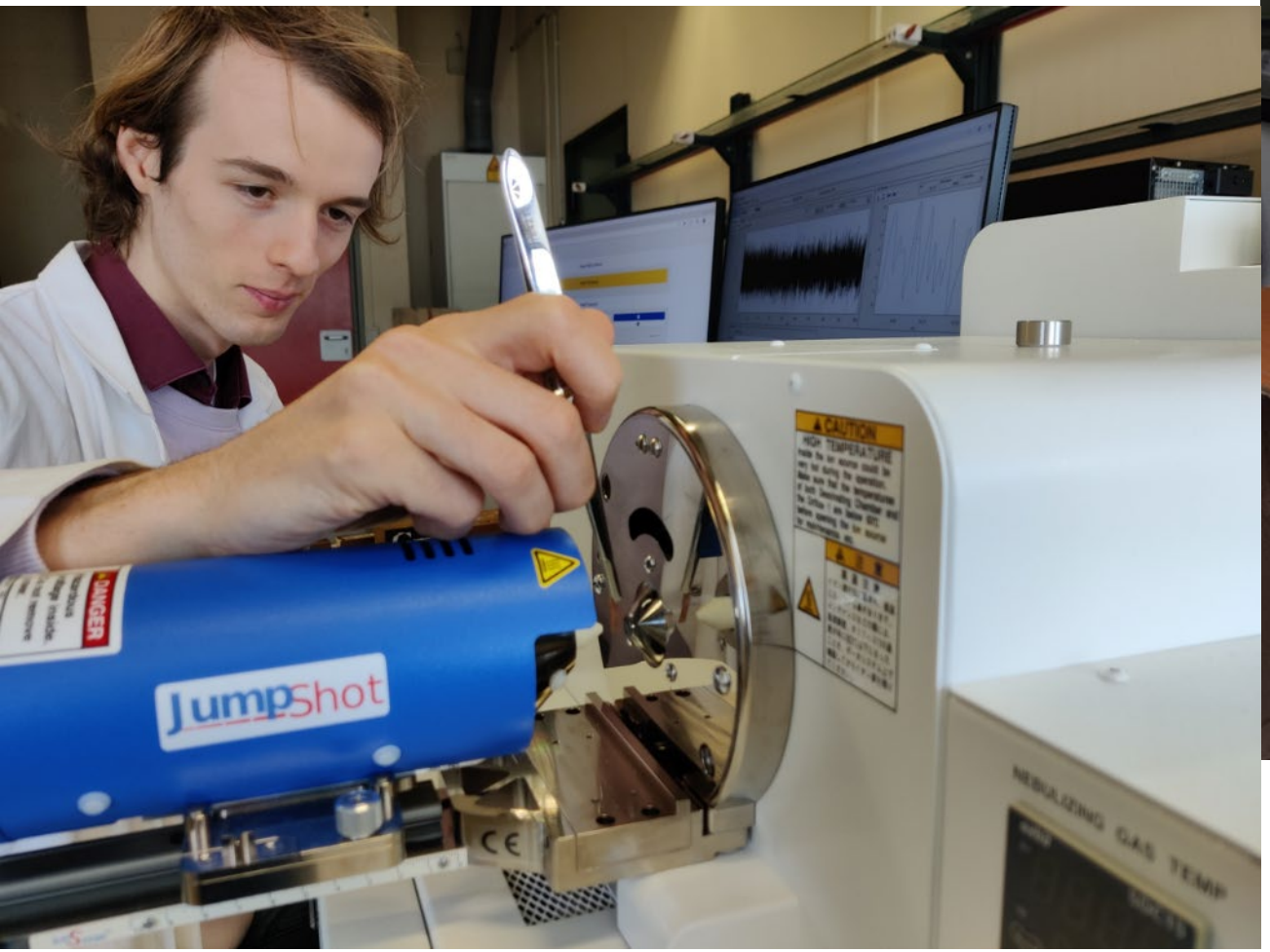




Determining risk of misdeclarations for large volumes of wood through digital microscopes, apps, etc.

WOOD IDENTIFICATION METHODS

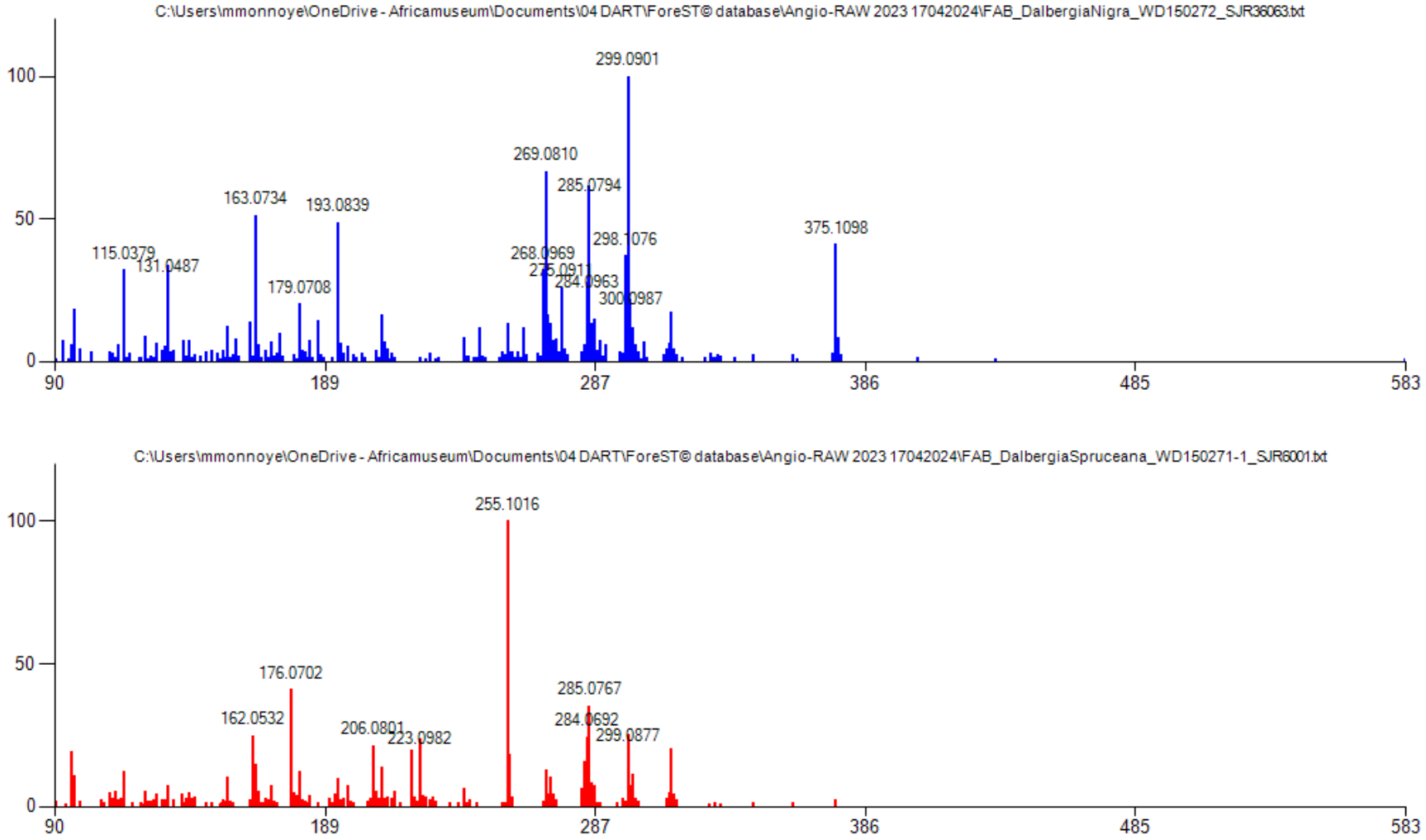
- DART-TOFMS





WOOD IDENTIFICATION METHODS

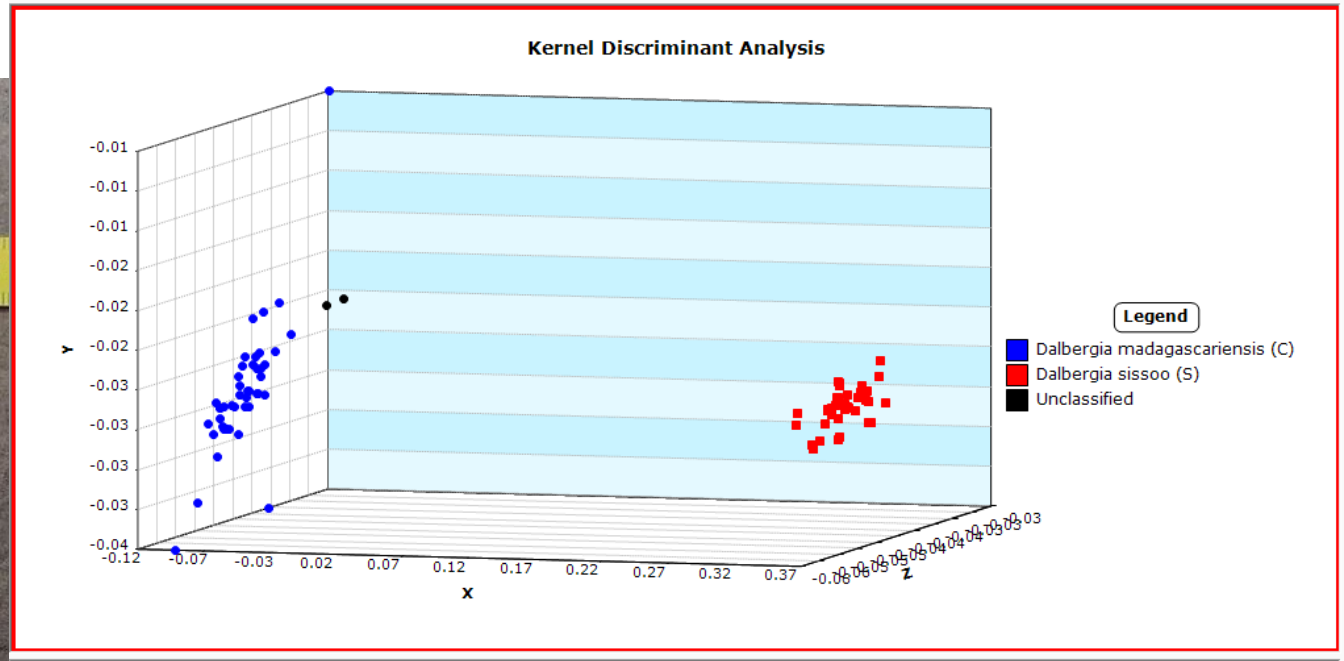
- DART-TOFMS: direct comparison



WOOD IDENTIFICATION METHODS

- DART-TOFMS
- Question: verify *Dalbergia sissoo*
- Result: *Dalbergia madagascariensis*, or other *Dalbergia* from Madagascar



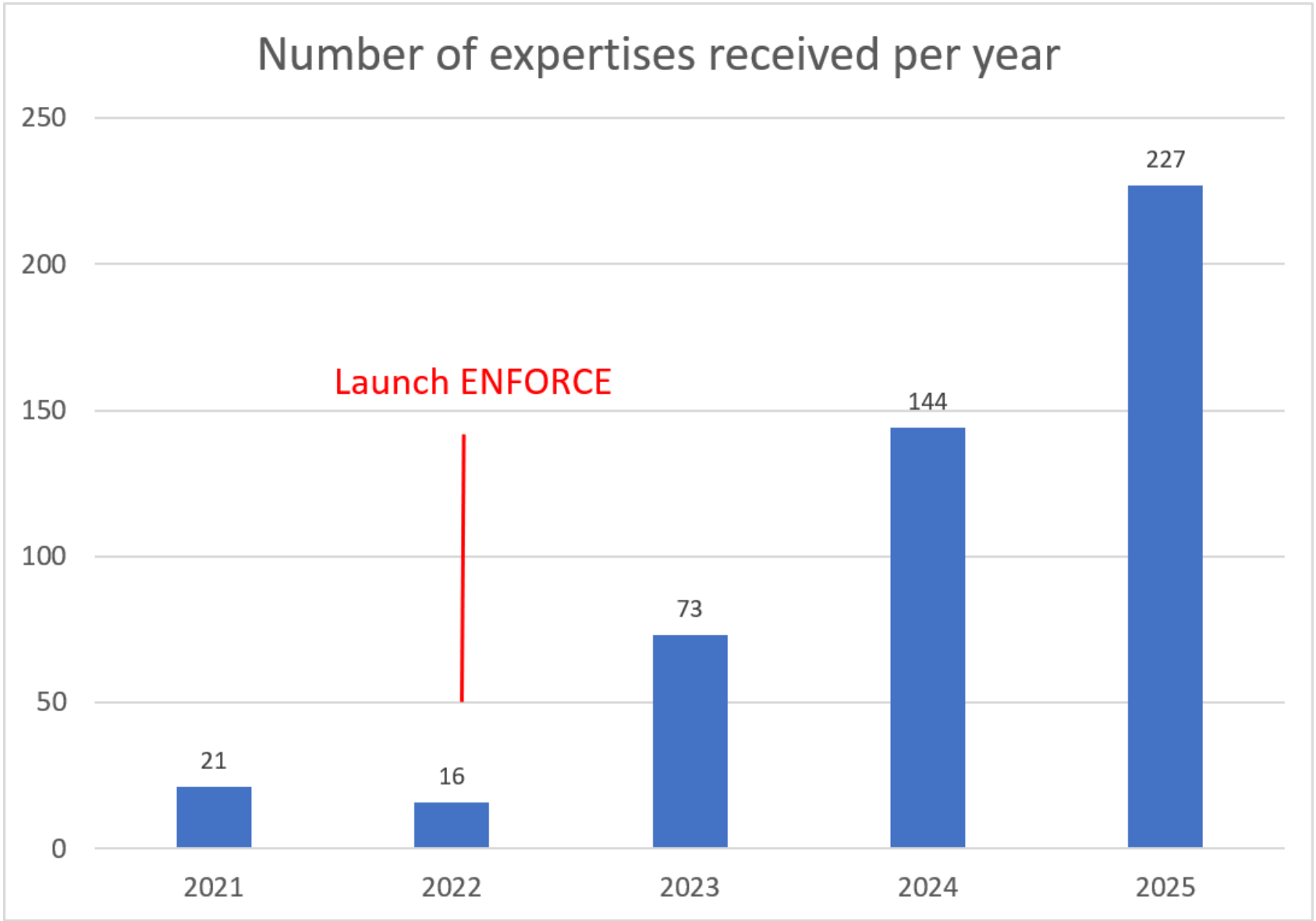


Validate (LOOCV) Halt Enlarge Graph

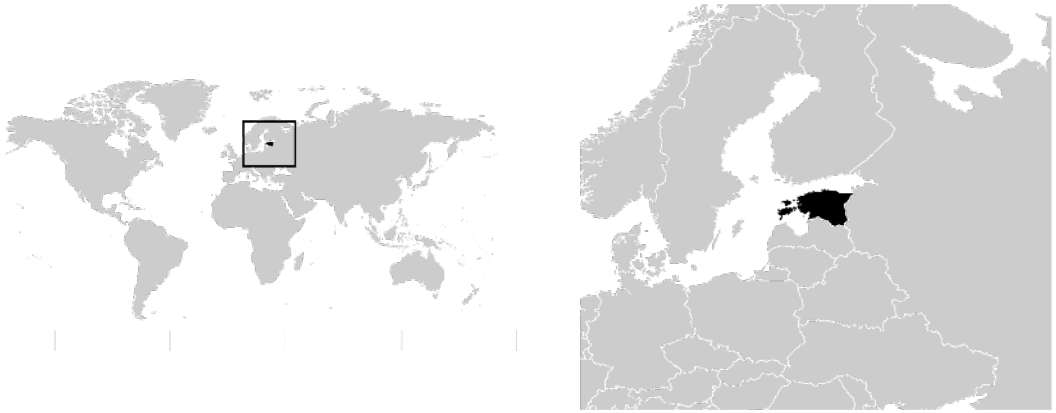
File	Distance	Class	Prob. %	Class name
exp818_sliver1.txt	0.08226	0	99.78	Dalbergia madagasca...
exp818_sliver2.txt	0.073531	0	99.46	Dalbergia madagasca...

CITES species level distinctions

- ***Dalbergia*** *(e.g. D. nigra, D. sissoo, D. madagascariensis …)*
- ***Afzelia*** *(e.g. A. bipindensis, A. africana, A. pachyloba …)*
- ***Pterocarpus*** *(e.g. P. soyauxii, P. tinctorius, P. erinaceus, P. santalinus …)*
- **Mahogany**
  - *Swietenia* spp.,
  - *Entandrophragma* spp. (e.g. sapelli / sipo?),
  - *Khaya spp*.
  - …
- ***Dipteryx*** (species groups distinctions)
- …

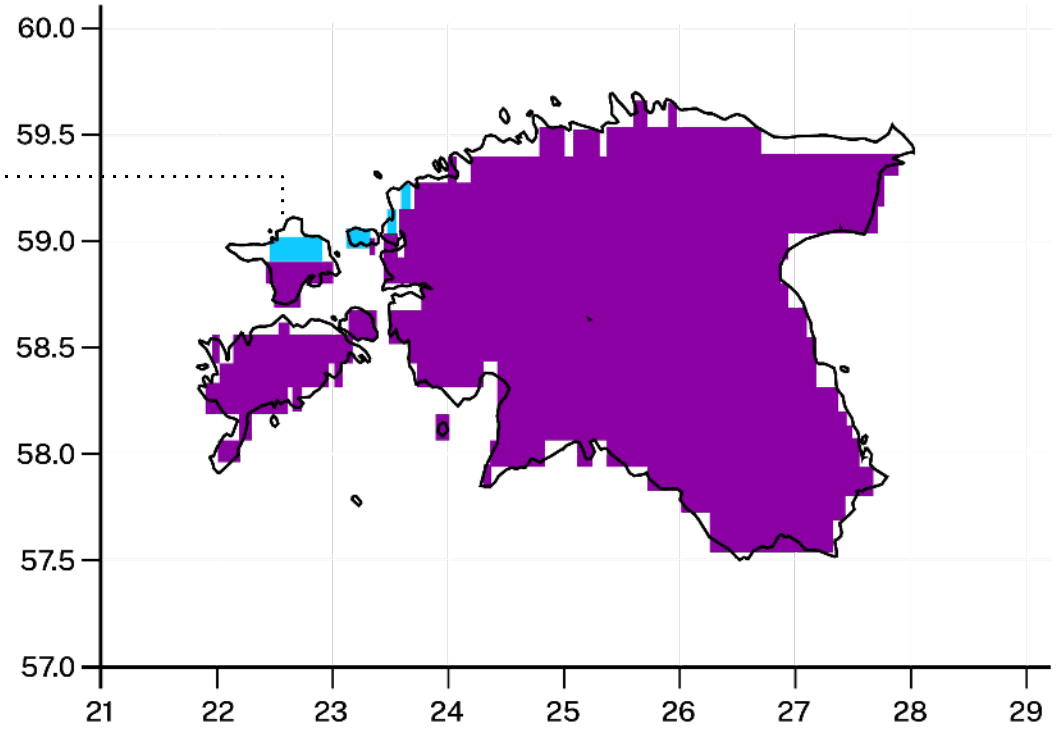

Number of expertises received per year
250
200
150
100
50
0
Launch ENFORCE
21
16
73
144
227
2021
2022
2023
2024
2025

Verification Birch (*Betula*)



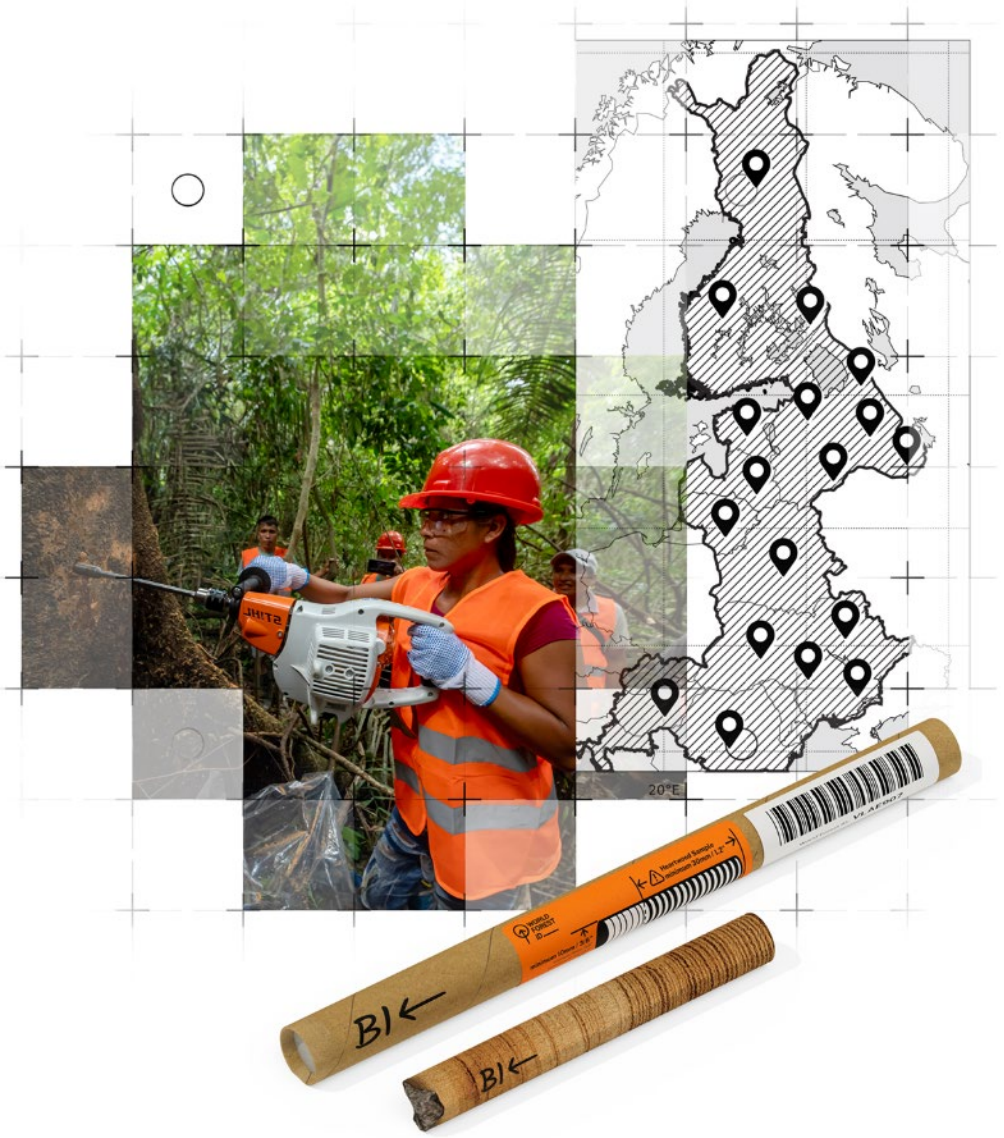
Claim - South Estonia, Betula pendula, solid timber. 4 Stable Isotope Ratio (SIR) values given.

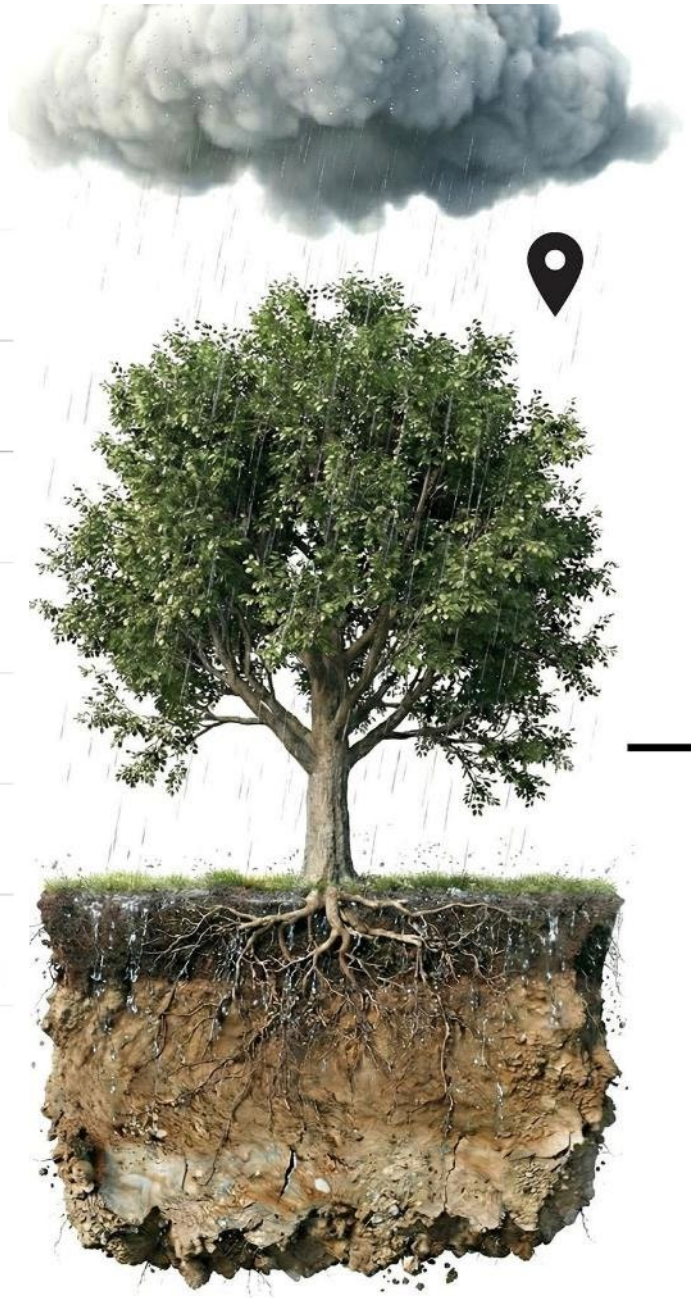
Blue areas are the only areas we cannot reject as potential origin.



Our model indicates the claim of South Estonia is not plausible.

Measurements





STABLE ISOTOPE RATIOS

$\delta^{2}H$ (Hydrogen)

$\delta^{13}C$ (Carbon)

$\delta^{15}N$ (Nitrogen)

$\delta^{18}O$ (Oxygen)

$\delta^{34}S$ (Sulfur)

TRACE ELEMENTS

Aluminium

Barium

Bromine

Calcium

Chlorine

Copper

Iron

Lead

Manganese

Nickel

Phosphorus

Potassium

Rubidium

Silicium

Sulfur

Zinc

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