



Carbon, diversity indicators and structure of old-growth stands: what do we actually know?

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Assessment of old-growth stands in Latvia

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- *Stands: 82 (507 plots);*

- *Age:*

Pine 163 - 218 years

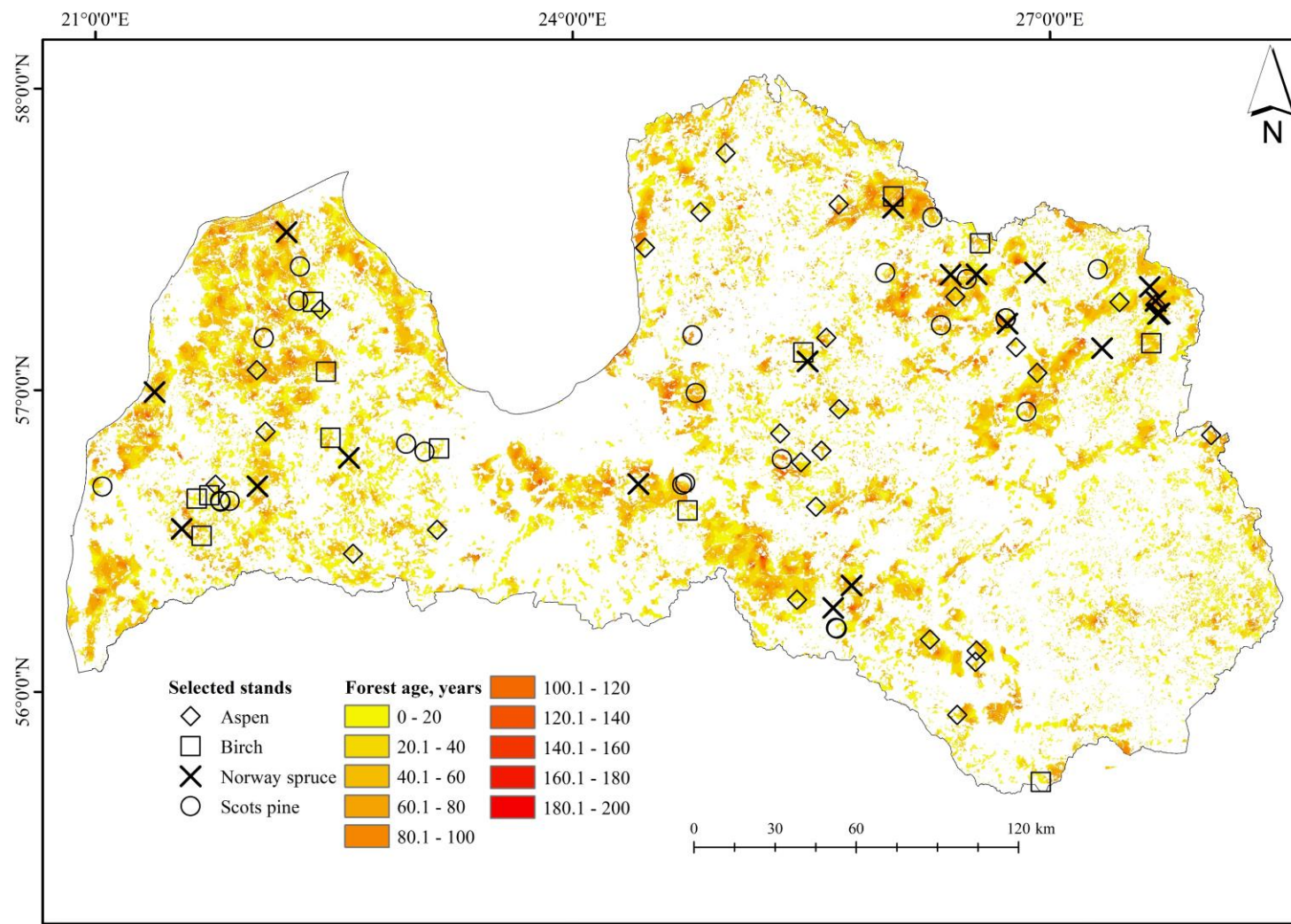
Spruce 170 - 205 years

Birch 123 - 148 years

Aspen 104 - 135 years

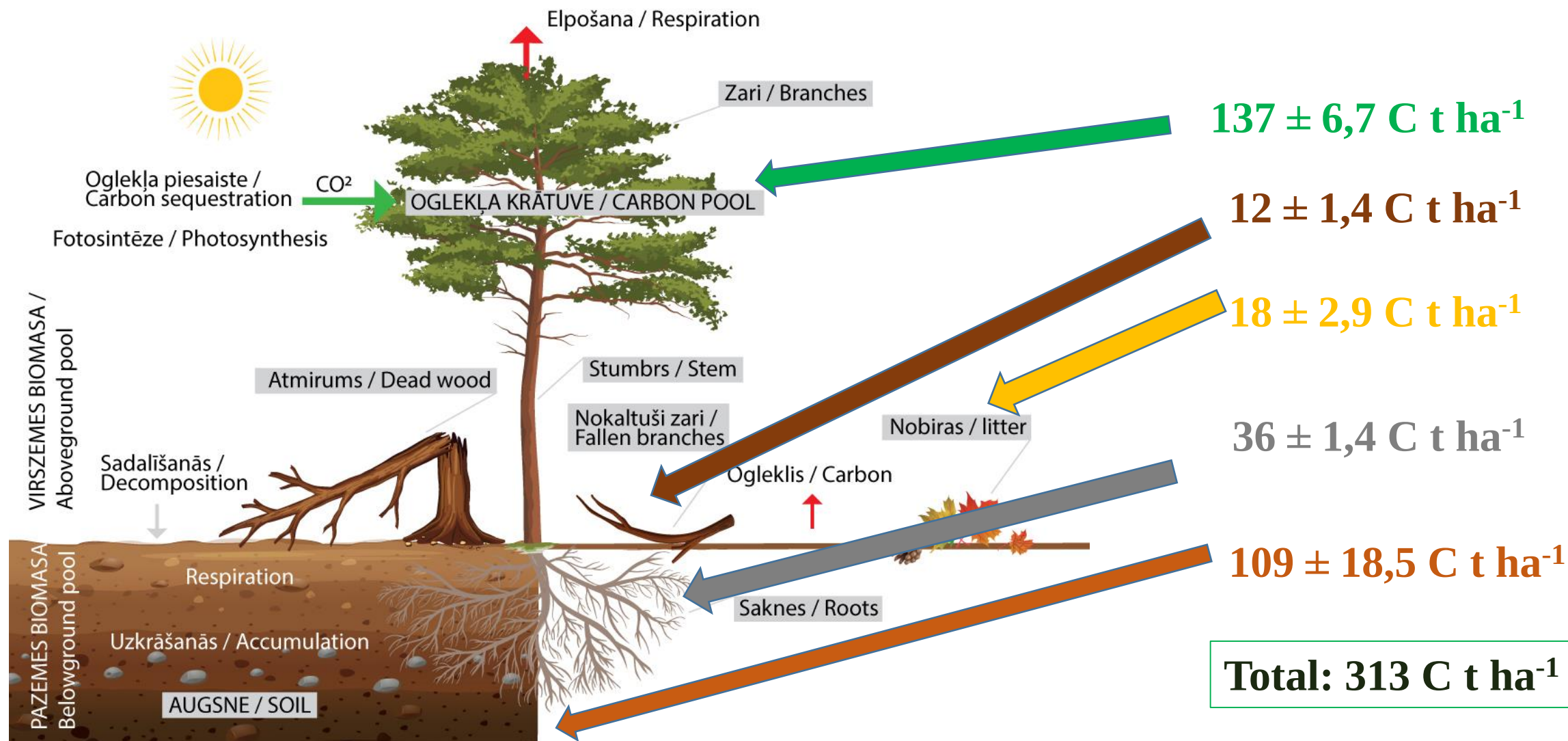
- *Forest on mesotrophic and oligotrophic mineral soils: Dm, Vr.*

- *Dominant species and age class*
> 50% from basal area of first layer;
 Thus we are assessing the maximum,
 rather than the average: the specific
 case, where old-trees dominate the
 old-growth forests



Assessment of old-growth stands in Latvia

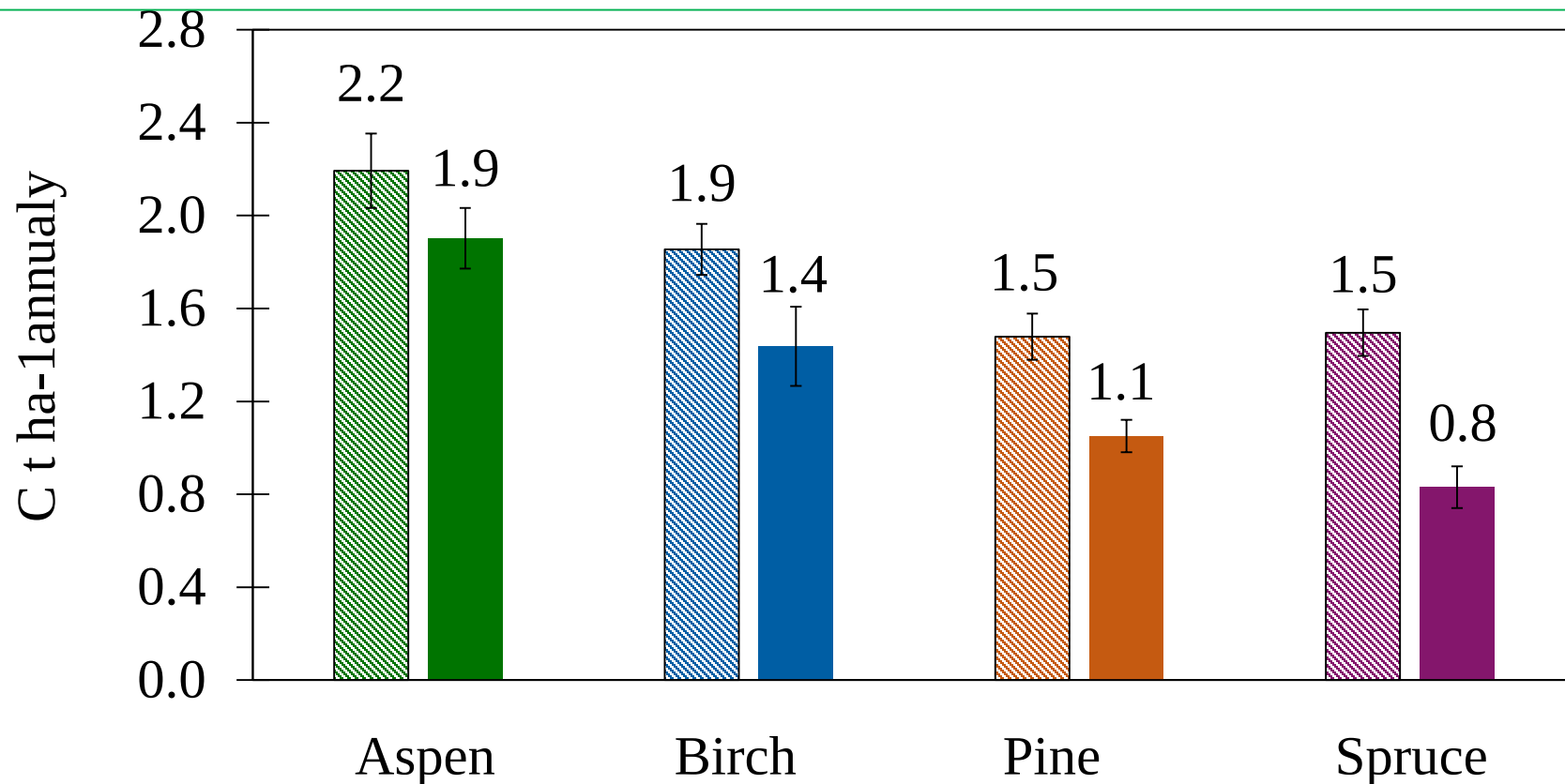
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Assessment of old-growth stands in Latvia

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Close to double the age had resulted in 20-40% increase in biomass and 20-38% increasing in deadwood carbon. Soil: fluctuations in $\pm 10\%$.



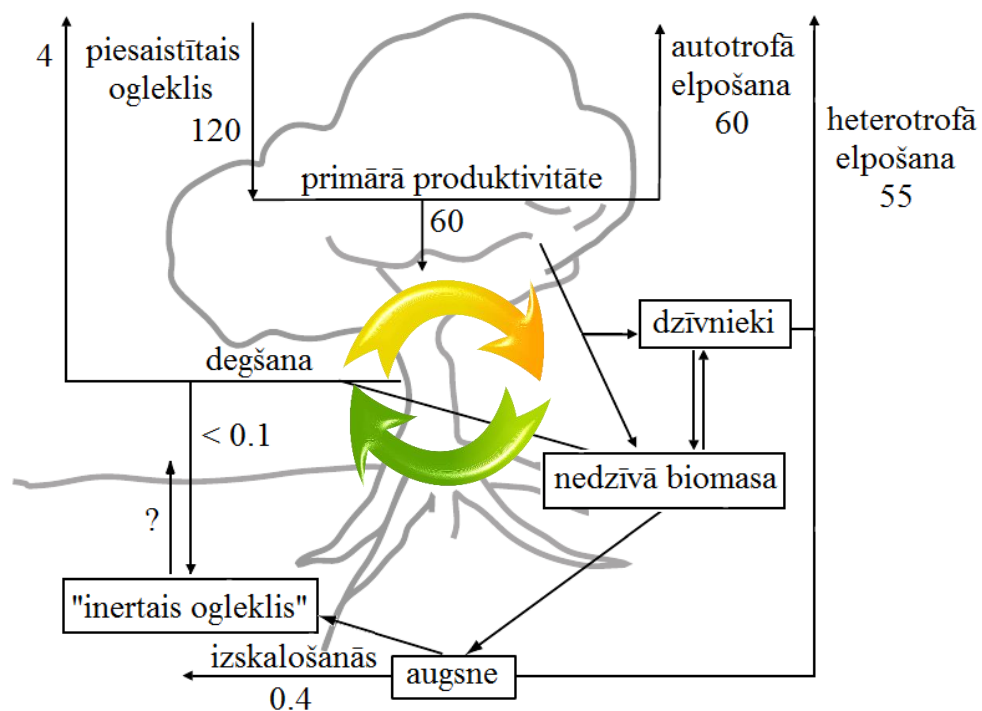
▨ Mature

■ Old-growth

Mean annual change
of carbon storage
is notably and
significantly smaller in
old-growth stands:
Aspen: -13 %
Birch: -23 %
Pine: -29 %

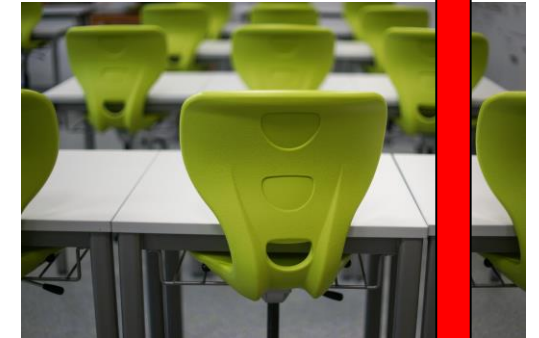
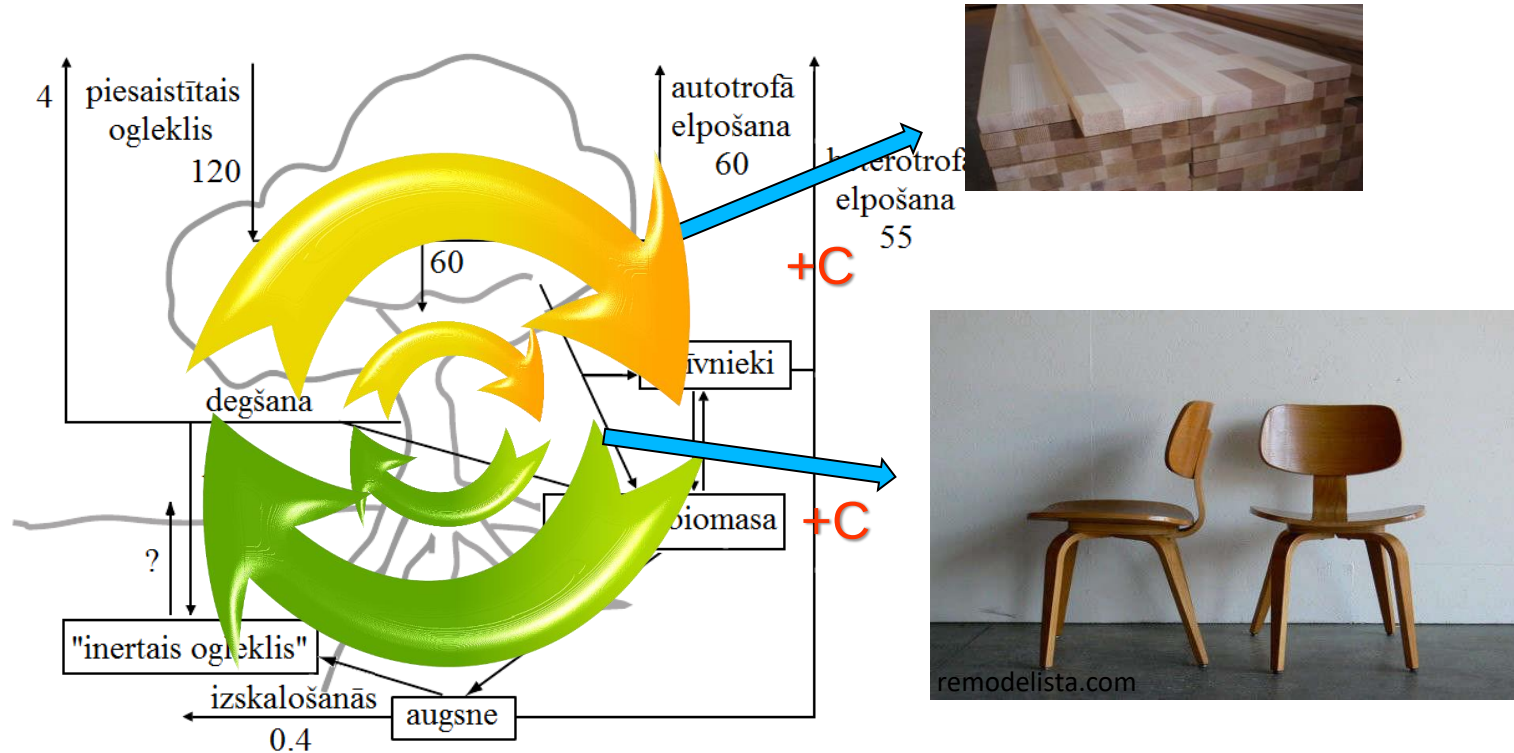
No-management is not an efficient mechanism to reach or sustain climate neutrality: the state, where current emissions are in balance with current sequestration (even if excluding the climate-amplified natural disturbances from the assessment)

How to increase climate change mitigation effect?



How to increase climate change mitigation effect?

Increase the carbon circle and do not add new fossil carbon into atmosphere

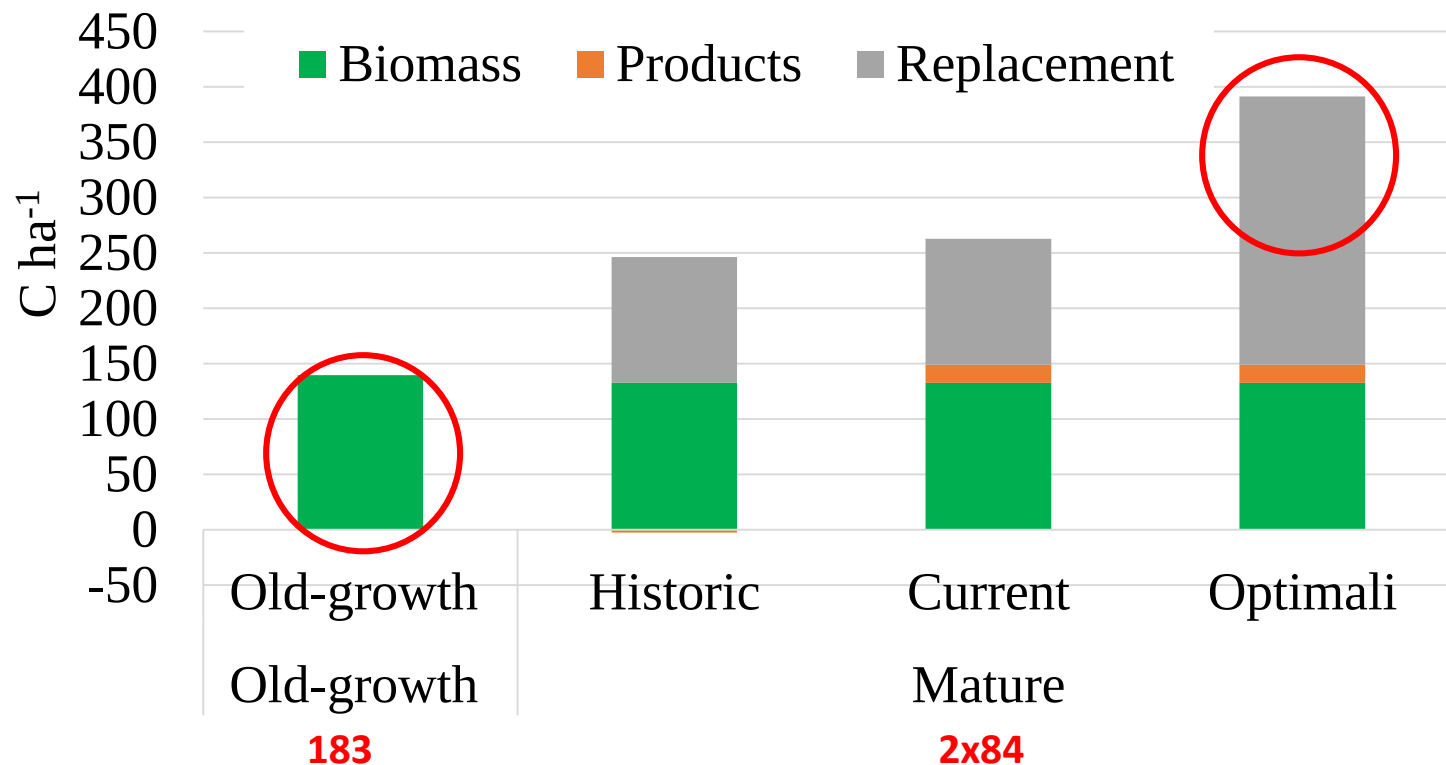


- Storage in forest (assessed per unit of time)
- Storage in products (assessed in volume and type):
 - a) in products
 - b) replacement effect (substitution)

Stand (per ha of land) perspective

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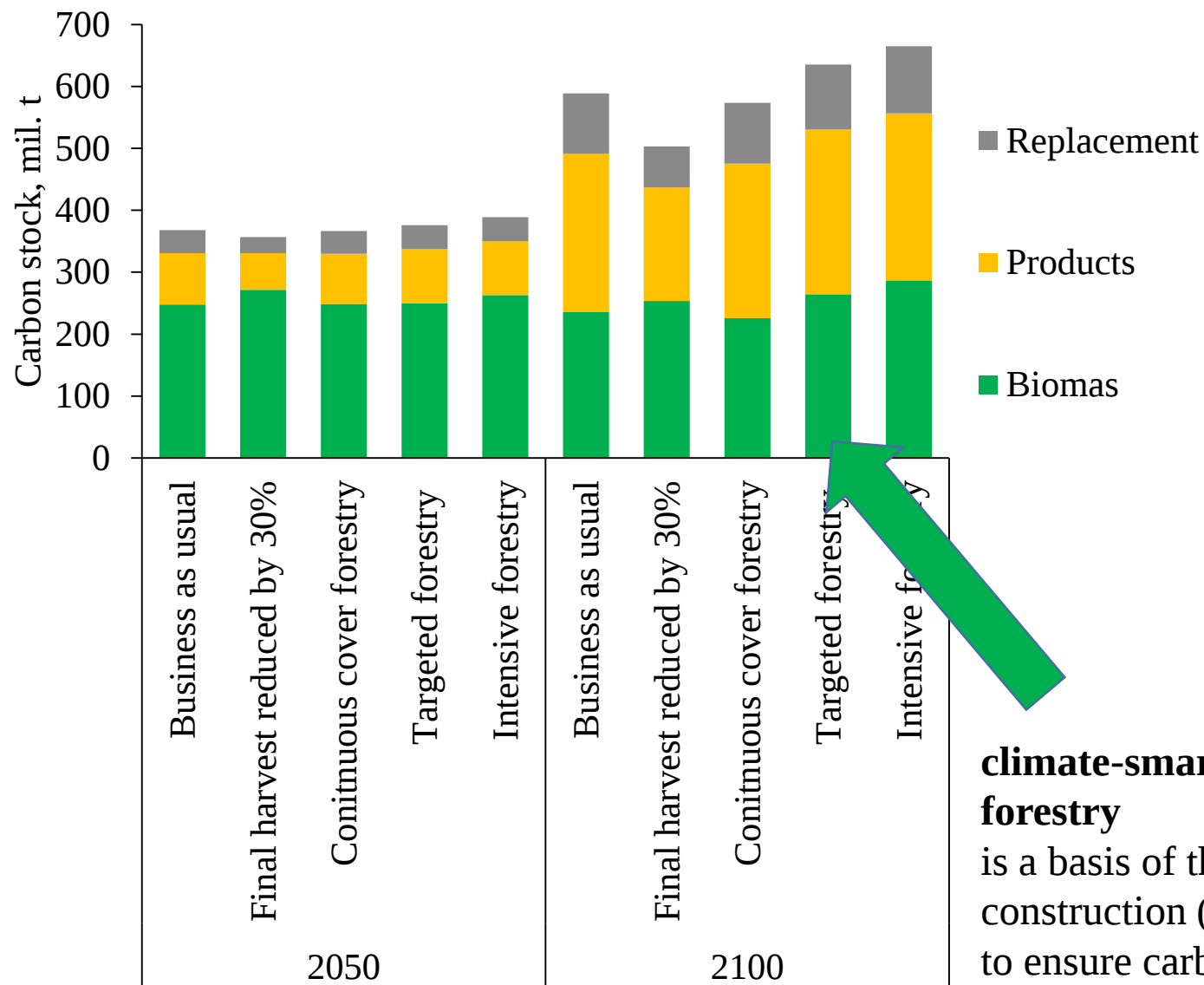
Development of a decision support tool integrating information from old-growth semi-natural forest for more comprehensive estimates of carbon balance(Nr. 1.1.1.1/19/A/130)



-Larger area without management = smaller contribution to climate change mitigation and climate neutrality!
+Investments in chemical processing wood and development of advanced products from wood are essential to reach climate change mitigation targets!

Efficient forestry + mechanical and chemical wood processing = higher climate change mitigation effect
(also from the emission accounting perspective!)

State perspective

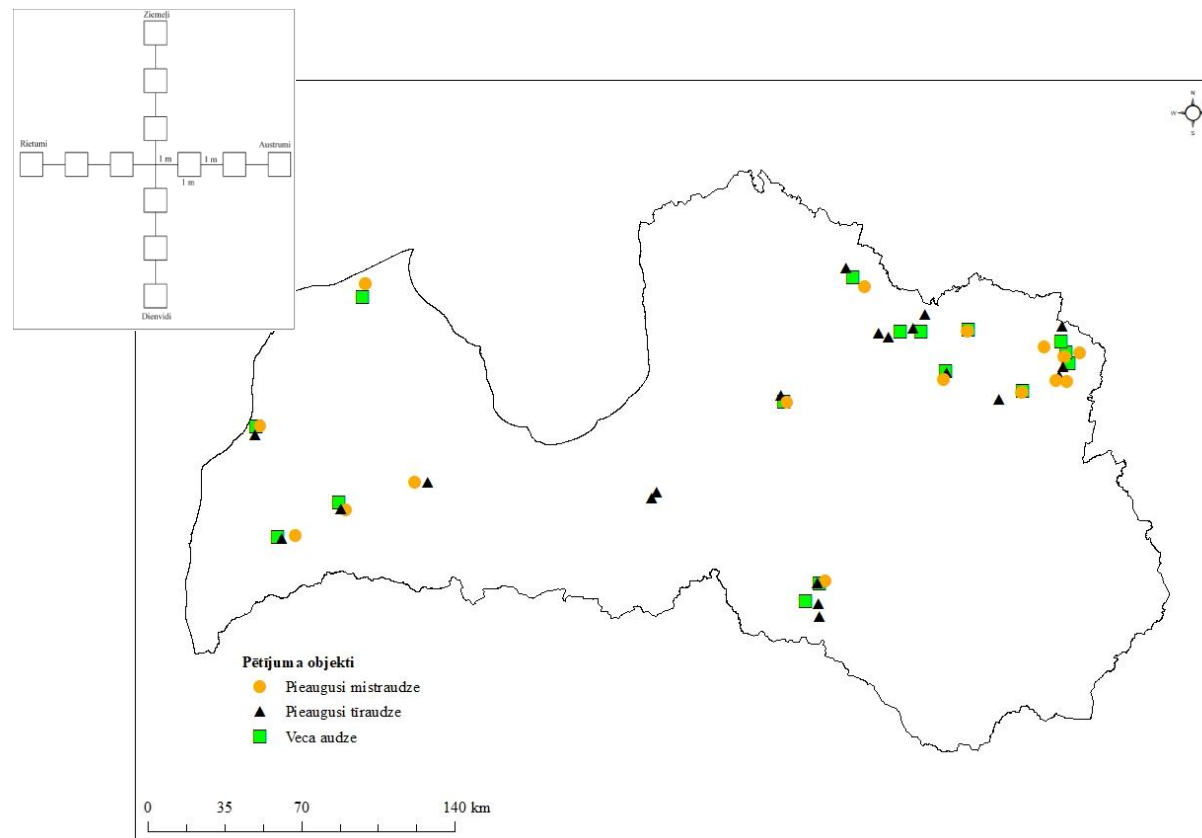
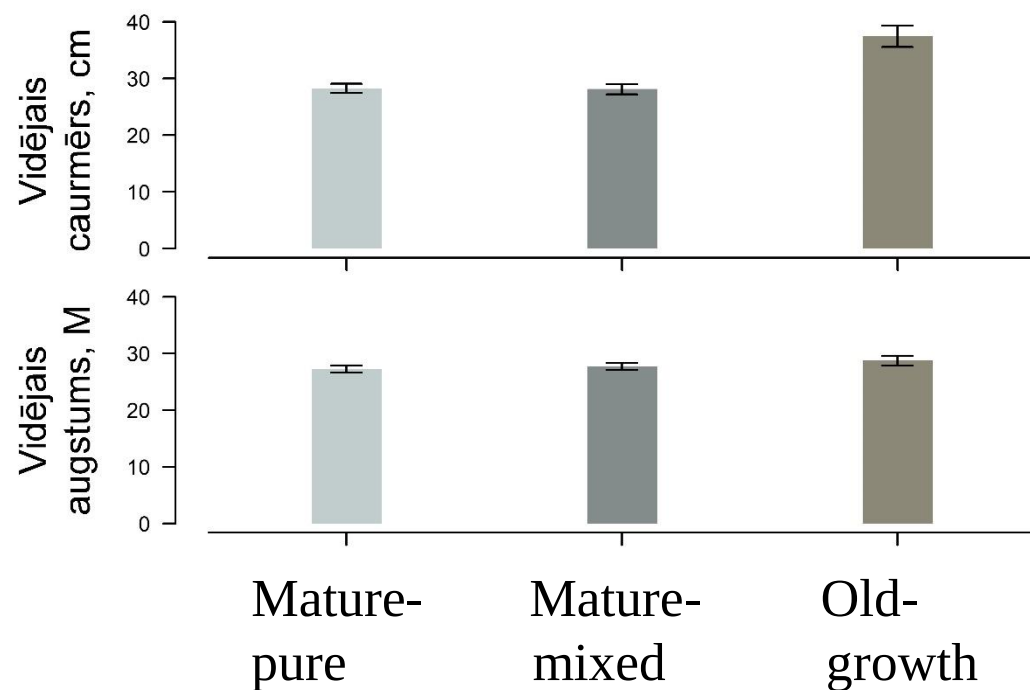


➤ Reduction of final harvest level will ensure increased carbon storage in tree biomass, however, will reduce the total climate change mitigation effect of the forest sector in short (2050) and long (2100) term (even without considerations of potential increased replacement effect)

climate-smart forestry
is a basis of this construction (i.e. basis to ensure carbon stock in growing trees)

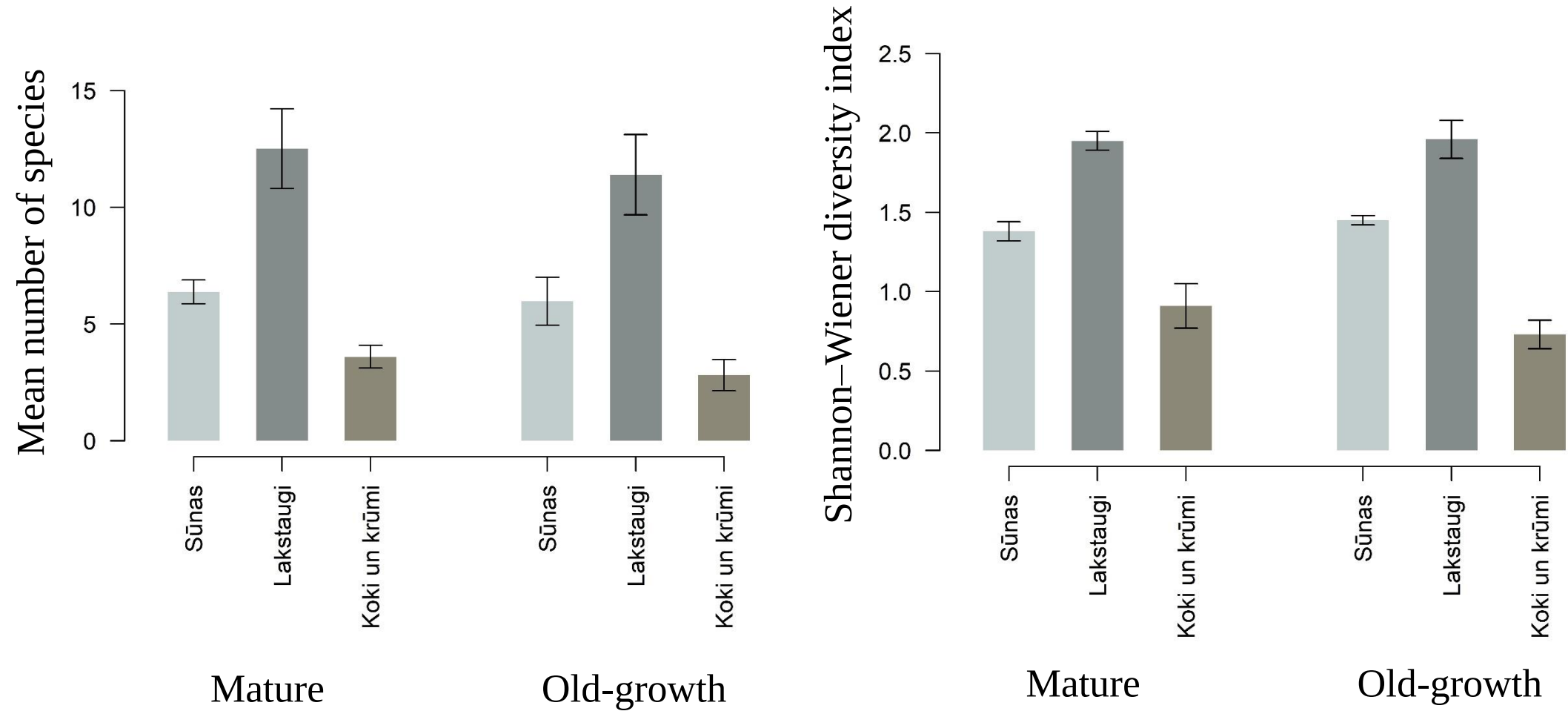
Old-growth stands and biodiversity: ground vegetation

The impact of forest management on forest and related ecosystem services, 5-5.9.1_007n_101_21_76



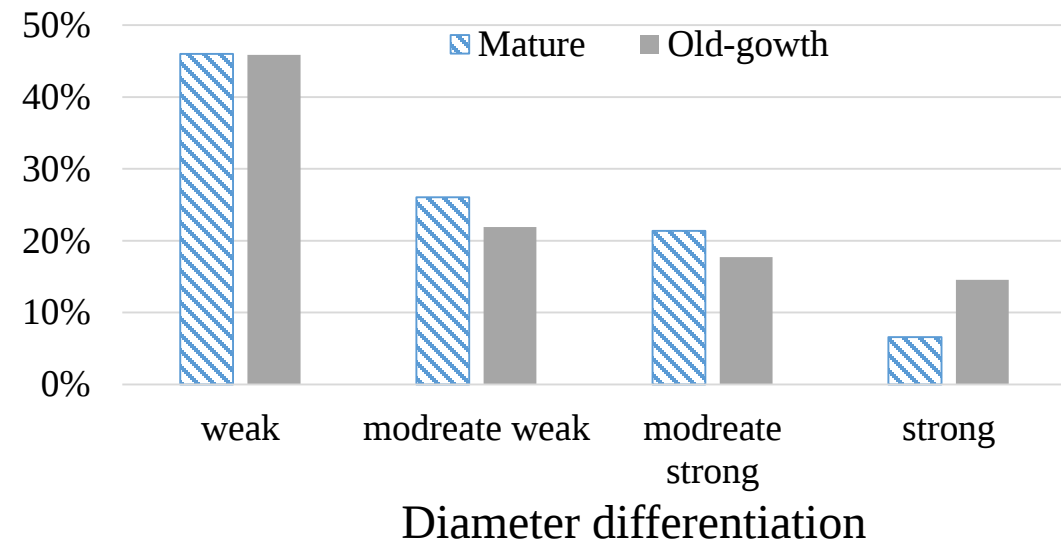
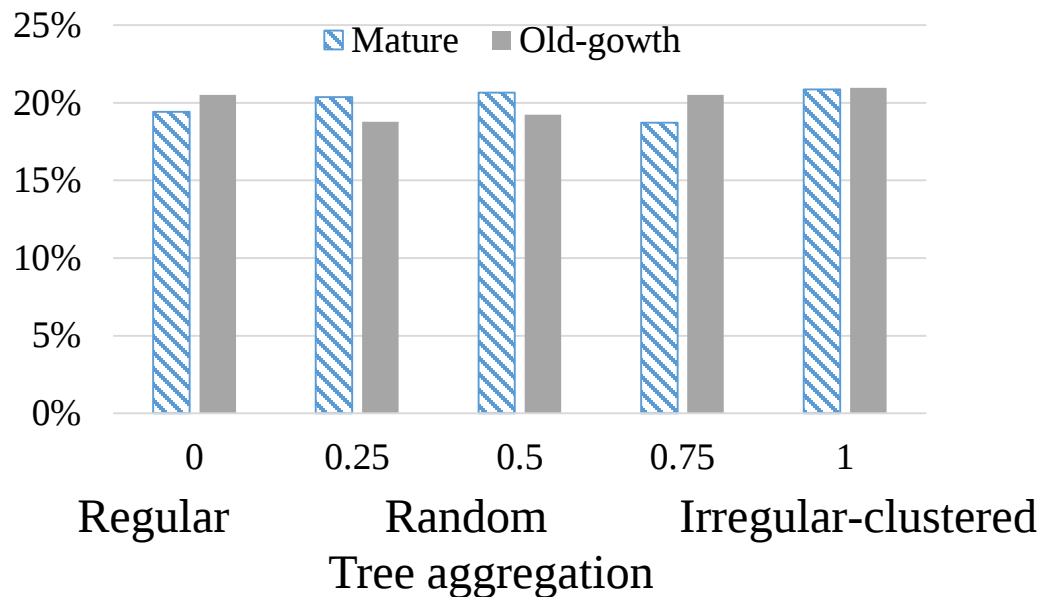
Direct comparison between mature and old-growth
Norway spruce stands

Old-growth stands and biodiversity: ground vegetation



Old-growth stands and biodiversity: trees

Trends of tree aggregation, species mingling (0.34 vs. 0.37) and size differentiation (trees >6cm measured) are similar between Mature and Old-growth stands



What does “biodiversity” need?

Age is a very weak (yet attractive) proxy for the traits that are actually important for biodiversity. Detailed analysis are important to help shape the forest management, incorporating biodiversity (reforestation) rather than deliberately causing a conflict between "protection" and bioeconomy.

Jansons et al., in prep.

Where in the Europe forest will ensure basis for Union-wide bioeconomy and climate change mitigation?



Prognosis
2100

Suitable for
commercial forestry



34% (Unsuitable for commercial forestry)



Hanewinkel, M., Cullmann, D. A., Schelhaas, M. J., Nabuurs, G. J., & Zimmermann, N. E. (2013). *Nature Climate Change*, 3(3), 203.

Research and policy cooperation in our region is essential

Implementation of research results and sector-wide approach can ensure realization of aims of climate-smart forestry: forest adaptation and contribution to climate change mitigation, while increasing productivity and bioeconomic value!

Looking forward to research and policy cooperation!

Thank You!



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