The carbon balance of managed boreal forests in Sweden

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Fluxes & Scales

Net Ecosystem Production (NEP)

= Gross primary production (GPP) – Ecosystem respiration (ER)
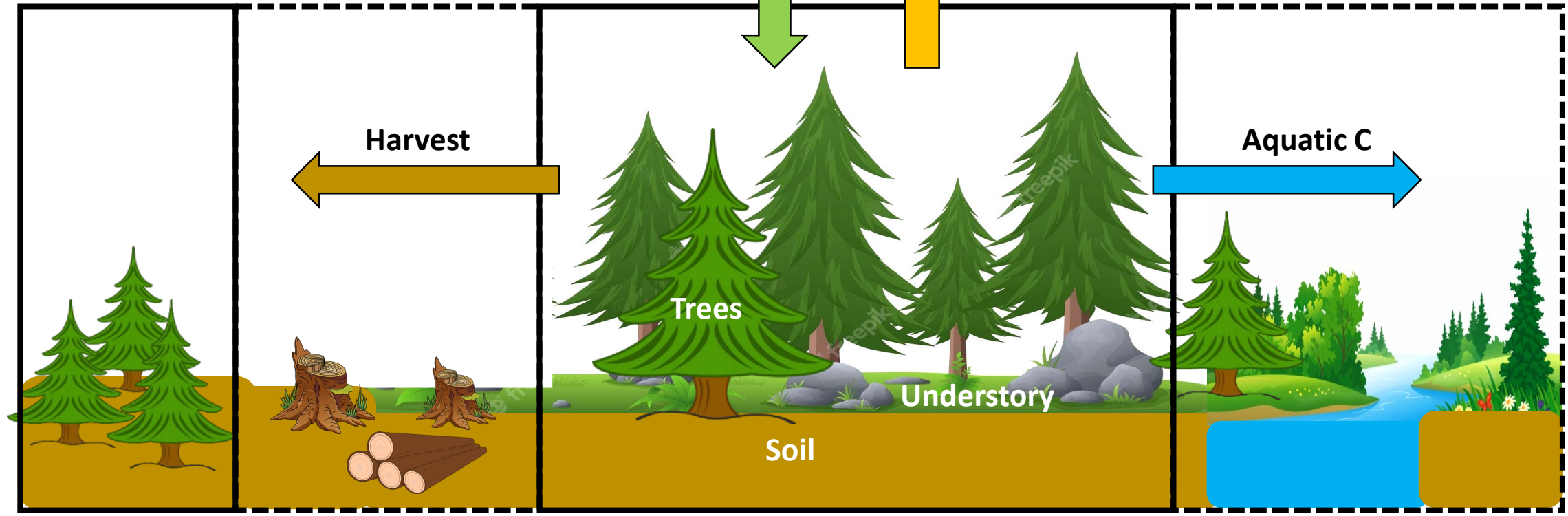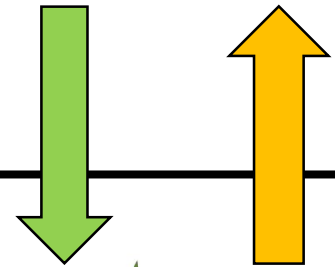
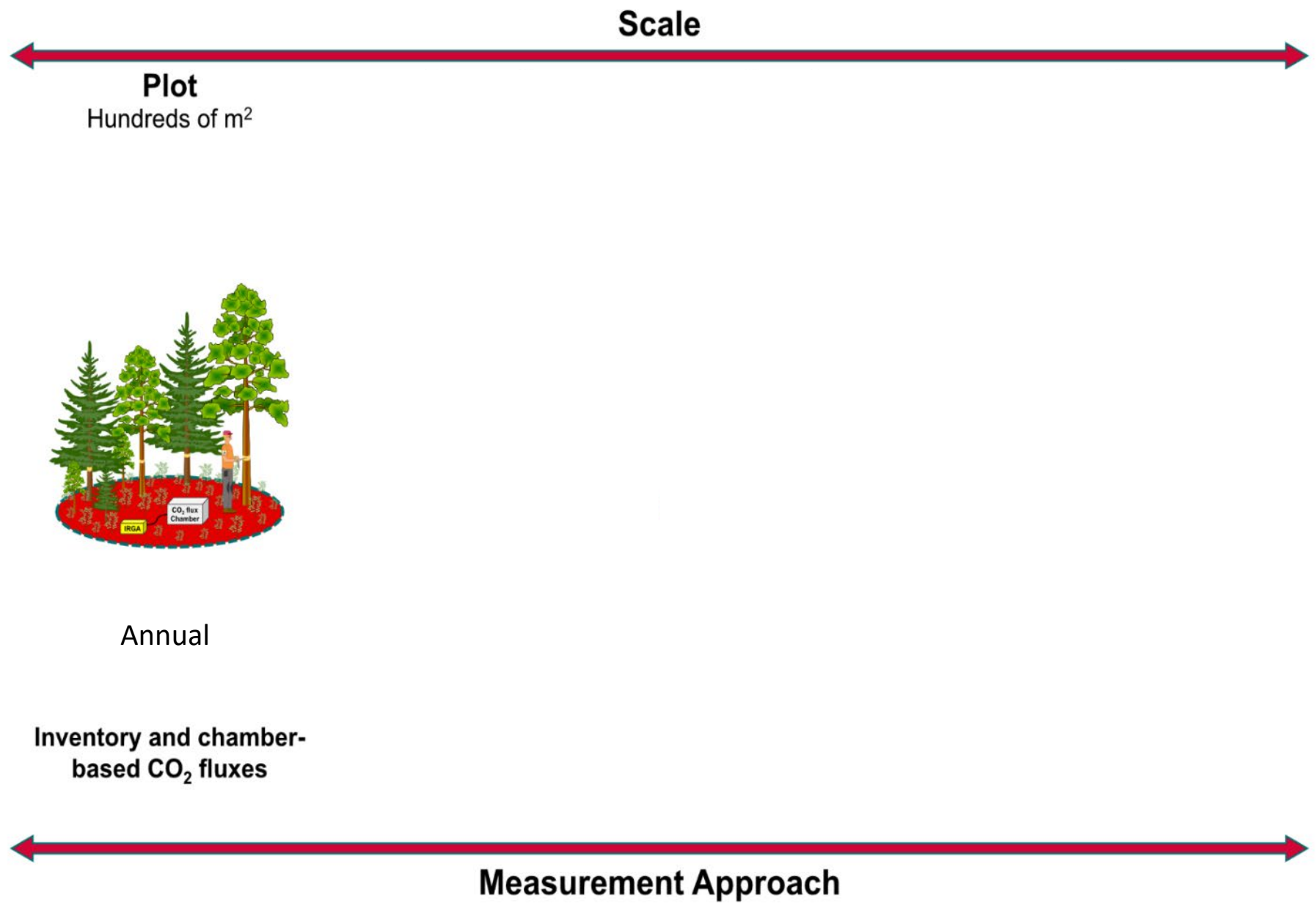(=NPP+Ra)   (=Rh+Ra)

= Net primary production (NPP) – Heterotrophic respiration (Rh)

Biomass production
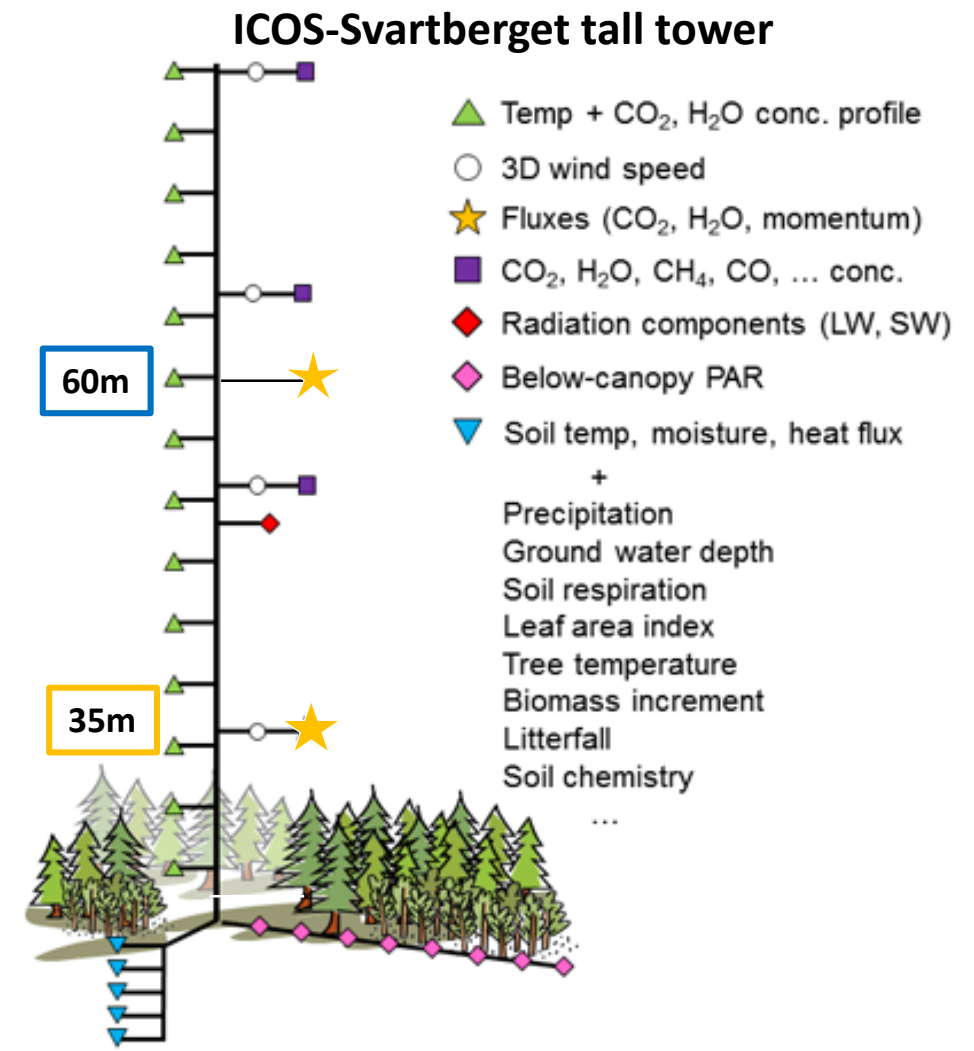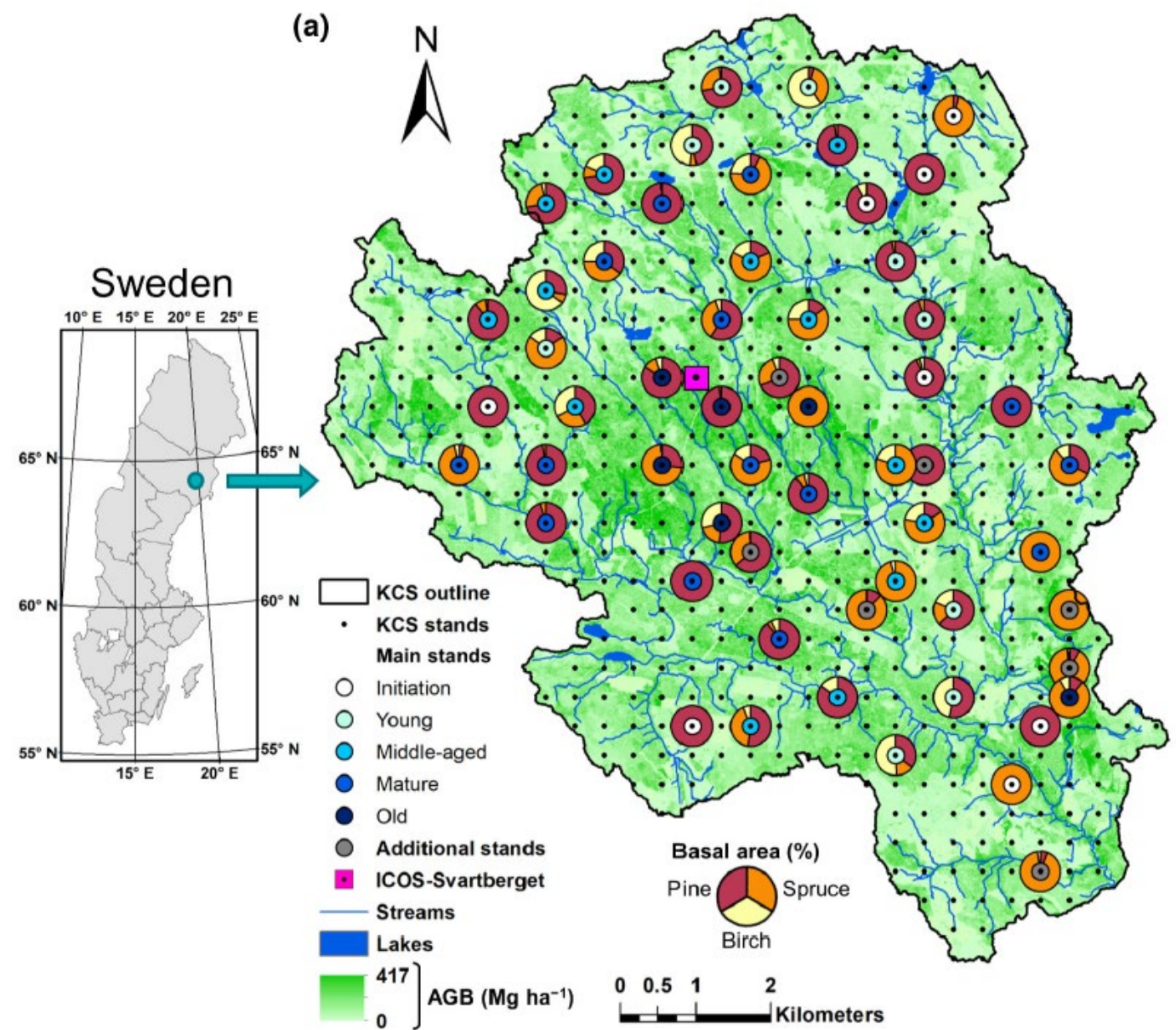- **Living and dead trees**
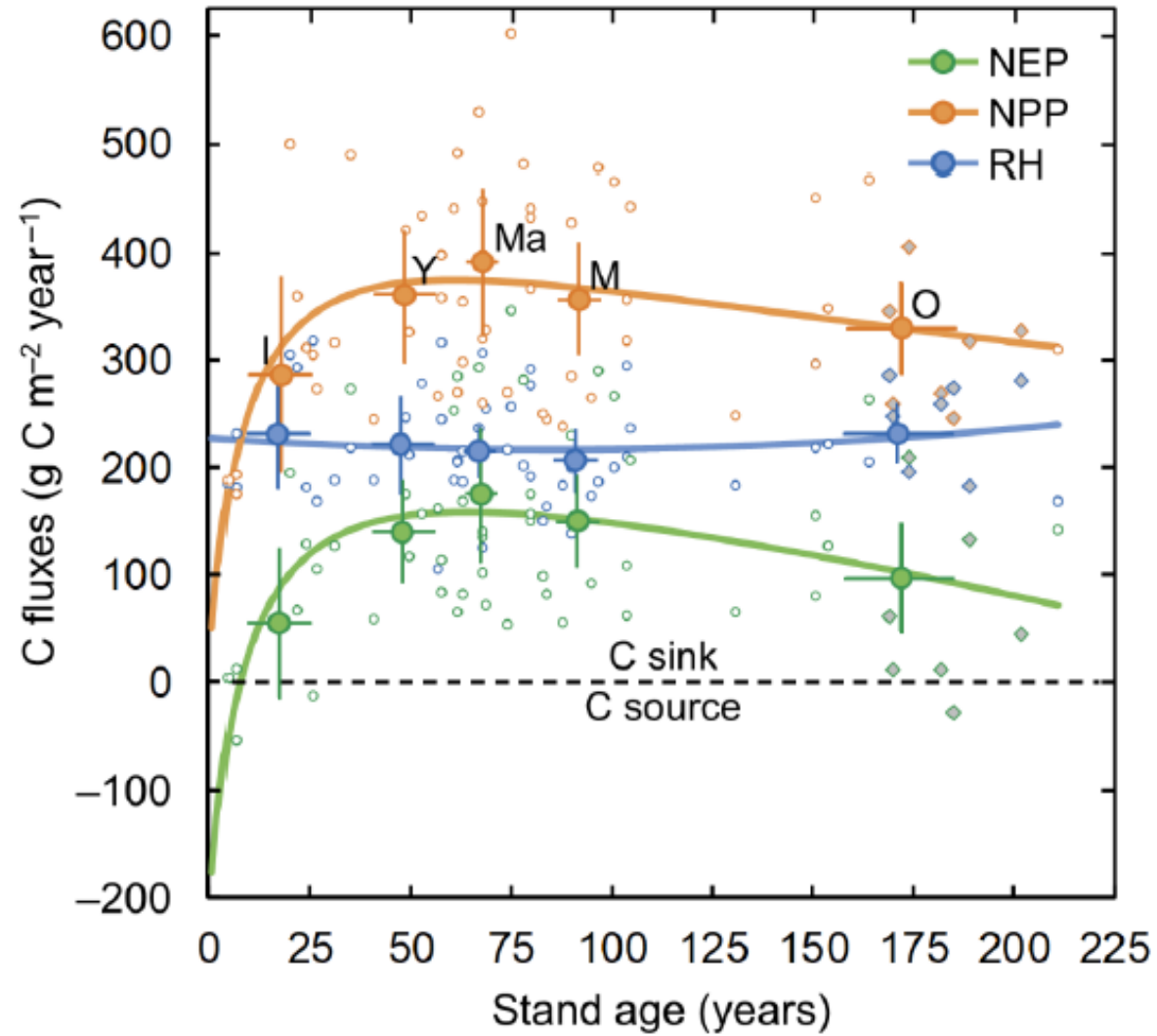- **Ground vegetation**

Decomposition
- **Soil organic matter**
- **Woody debris**

Harvest

Aquatic C

Trees

Understory

Soil

The boreal forest C balance from plot to region

Scale

Plot
Hundreds of m²

Annual

Inventory and chamber-based CO₂ fluxes

Measurement Approach

Core study site – The Krycklan Catchment

Variability of the plot-scale forest C balance

Peichl et al. 2022, GCB

The C balance of managed boreal forests from plot to region

PLOT

Peichl et al. 2022, GCB
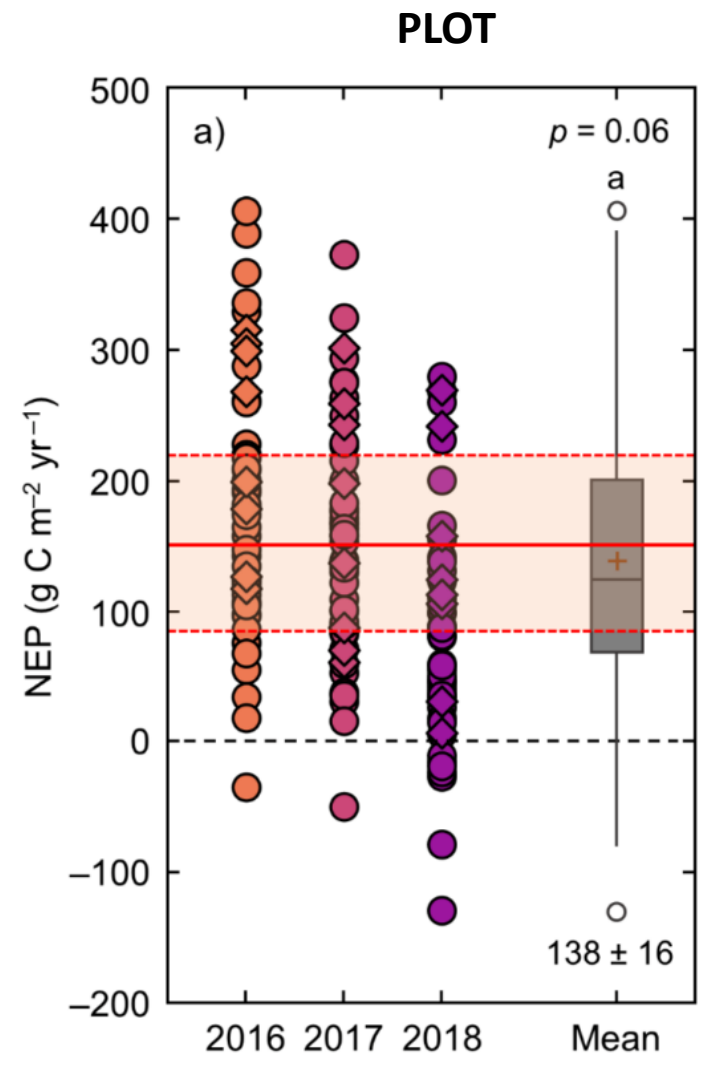
The Net Landscape Carbon Balance
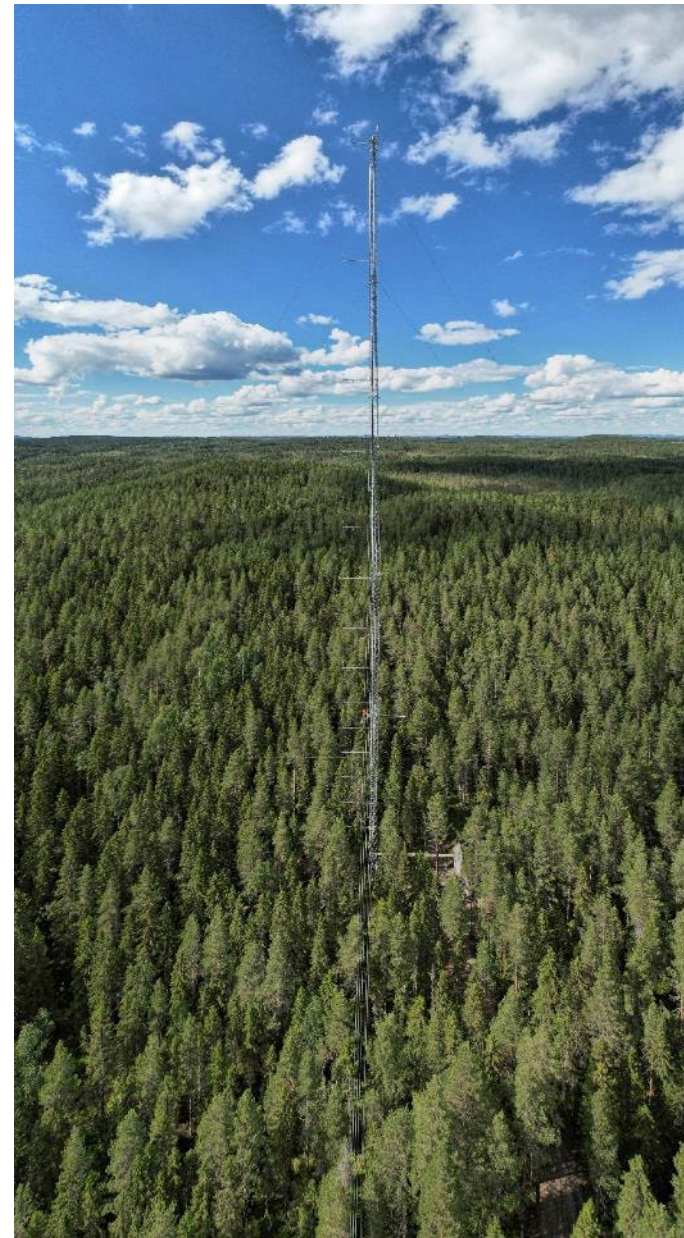

Chi et al. 2020, GCB
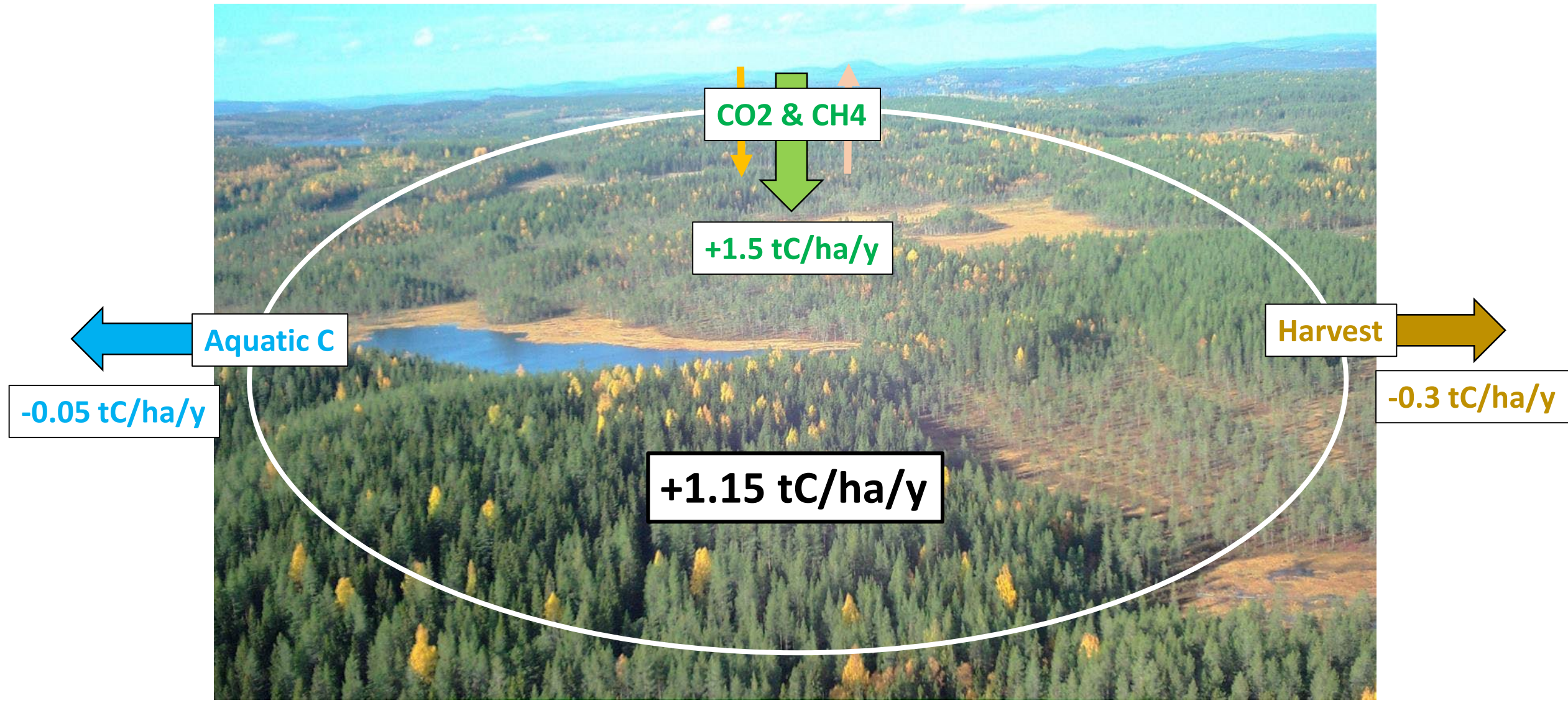
Summary

A need for defining scales when estimating the forest carbon balance

Complementing measurement techniques across scales needed to constrain the carbon balance

Plot- to regional scale estimates converge to a boreal forest carbon sink of 1.5 ± 0.7 tC/ha/year

The boreal forest landscape is a carbon sink even after accounting for lateral export fluxes via harvest and streams

Acknowledgements

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