

# Swiss Forests – still a carbon sink?

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LULUCF Workshop, JRC Ispra, 6-7 May



#### Swiss Greenhouse Gas Inventory

- Forest land dominates the greenhouse gas balance of Switzerland's land use, land-use change and forestry
- Forest carbon sink
  - increase in growing stock
  - Increase in forest area
- Decreasing trend in carbon sink since 1990
  - Due to drought and mortality
  - At present: still a sink
  - Shows the importance of adaptation of Swiss forests.

Switzerland's Greenhouse Gas Inventory 2025





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### Fagus sylvatica - Beech

 Decrease in growing stock and increase in mortality in Jura due to drought.

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![](_page_5_Picture_4.jpeg)

![](_page_6_Figure_0.jpeg)

![](_page_6_Figure_1.jpeg)

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#### Fagus sylvatica

![](_page_7_Figure_1.jpeg)

![](_page_7_Figure_2.jpeg)

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![](_page_8_Picture_0.jpeg)

#### Picea abies - Spruce

#### Plateau: Increased mortality due to drought and bark beetle

![](_page_8_Picture_4.jpeg)

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![](_page_9_Figure_0.jpeg)

![](_page_9_Figure_1.jpeg)

 Decrease in growing stock and increase in mortality due to drought and bark beetle

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![](_page_10_Figure_0.jpeg)

# Ongoing research - Individual tree growth simulator Massimo

tree & stand characteristics+ location

Scenarios of harvest or growing stock development

tree & stand characteristics
climate + topography + soil +
N-deposition

Flury et al. (2024) Ecography Stadelmann et al. (2019) Forests Rohner et al. (2018) Eur J For Res

![](_page_10_Picture_7.jpeg)

![](_page_11_Figure_0.jpeg)

# Soil and climate-dependent ingrowth

#### Flury et al. (2024) Ecography

#### Problem

• (Empirical) models can not reproduce most recent measurements of NFI and have problems with some IPCC climate scenarios (e.g. RCP8.5).

#### Approach

- Define phenologically and demographically relevant climate data site-dependent and for ecologically coherent tree species groups.
- Refit the MASSIMO functions for growth, mortality and ingrowth for ecologically coherent tree species groups.
- Link our existing empirical functions with suitable processorientated functions.

New research 2025-2028: Improving the modelling of forest development for relevant climate scenarios

![](_page_12_Picture_7.jpeg)

![](_page_12_Picture_9.jpeg)

![](_page_13_Picture_0.jpeg)

## Thank you for your attention

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