

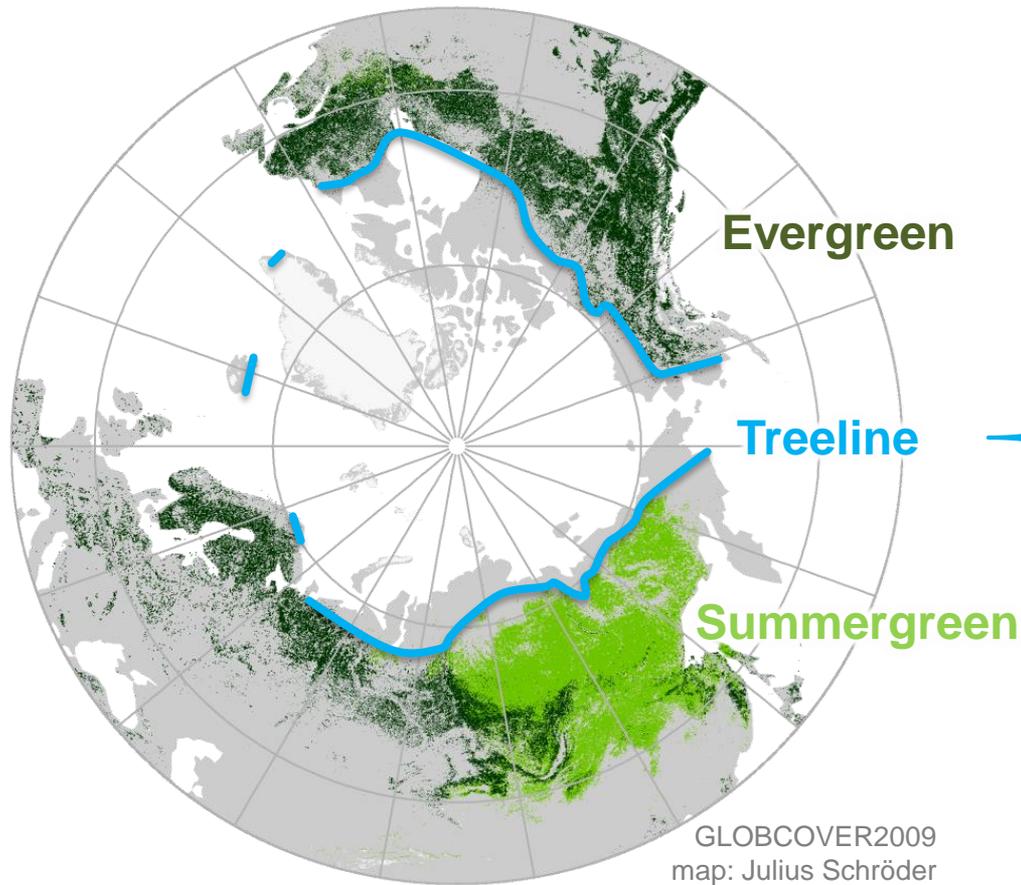
Stefan Kruse

Alexander Gerdes, Nadja Kath, Laura Epp, Kathleen Stoof-
Leichsenring, Luidmila Pestryakova, Ulrike Herzschuh



**How fast are larch trees migrating across the treeline
border in Siberia under recently increasing temperatures?
– results from a combined approach of genetics and modelling –**

Siberian treeline



North



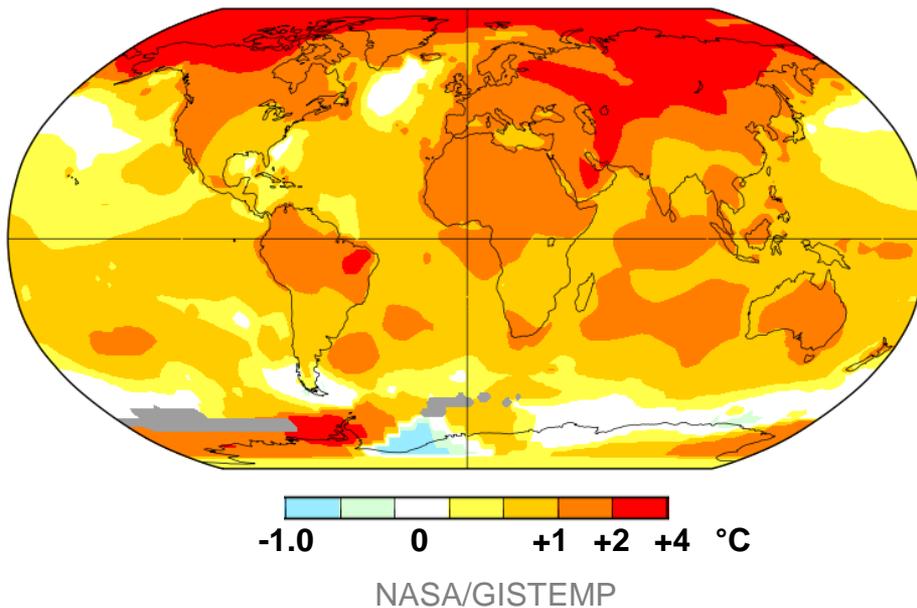
Stefan Kruse
M. Wiczorek

South

→ quasi-equilibrium with climate

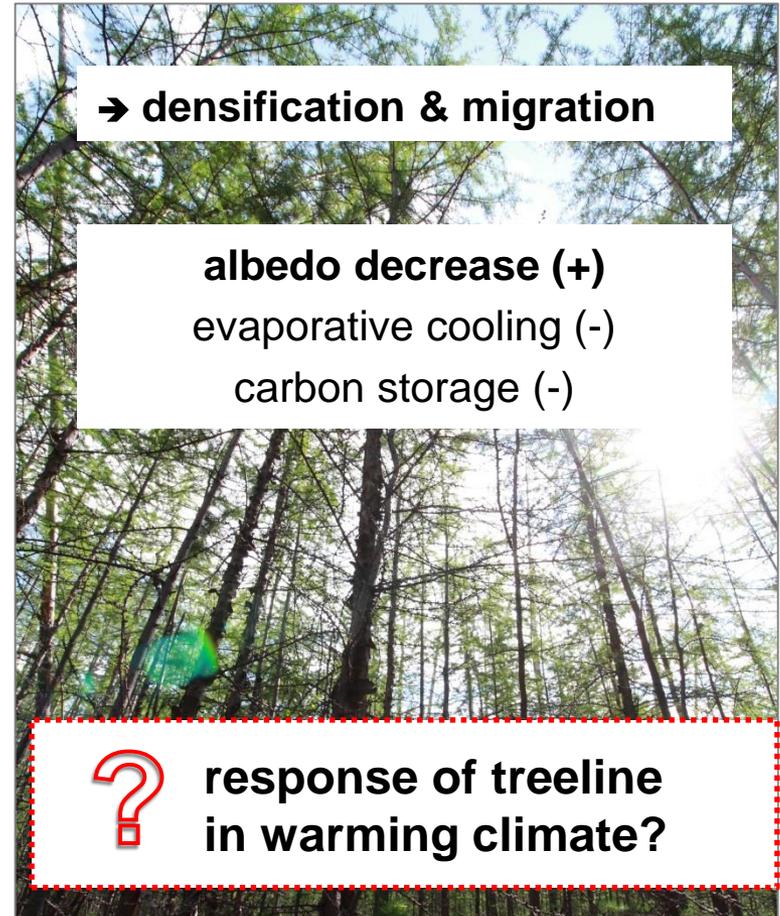
Climate warming

1951-2016



→ strongest warming
in the Arctic

Vegetation feedbacks



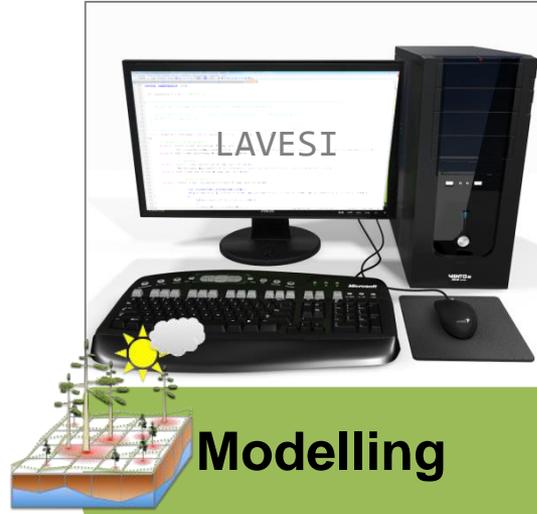
Methods



Field work

Stand structure

Recruitment pattern



Modelling

Model design & parameterisation

Simulation experiments

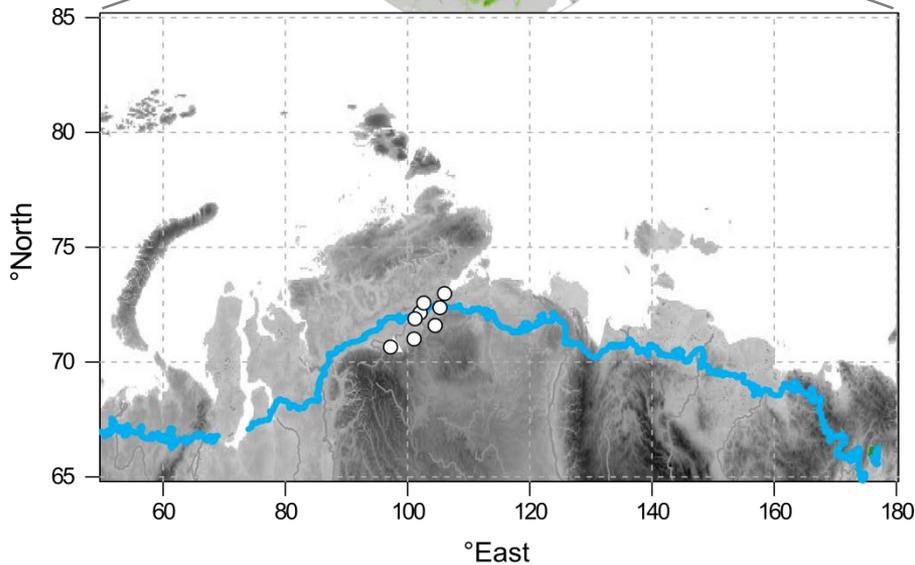
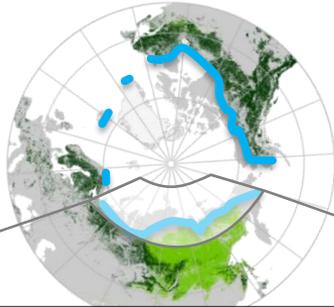


Genetics

Population genetics

Parentage analysis

Focus area



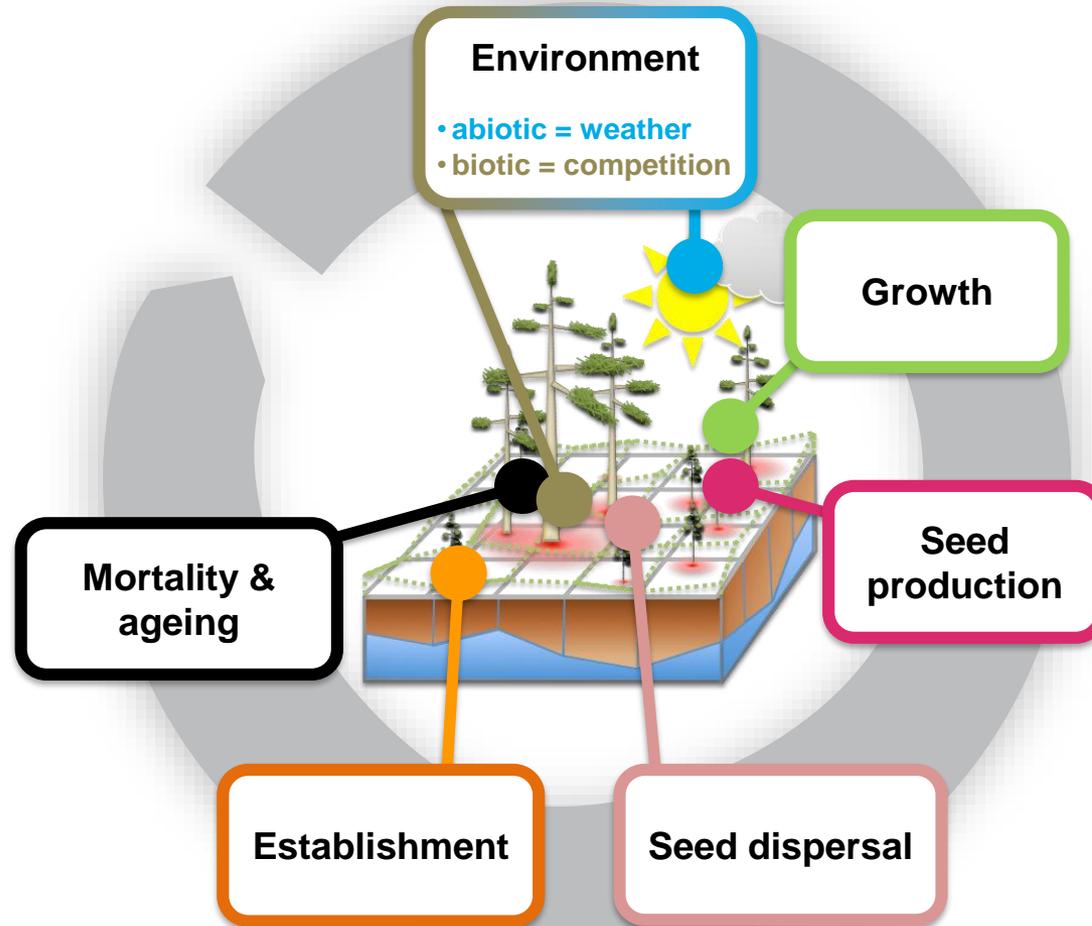
→ northernmost treeline at the Taymyr Peninsula



The *LA*rix VEgetation Simulator

→ spatially explicit

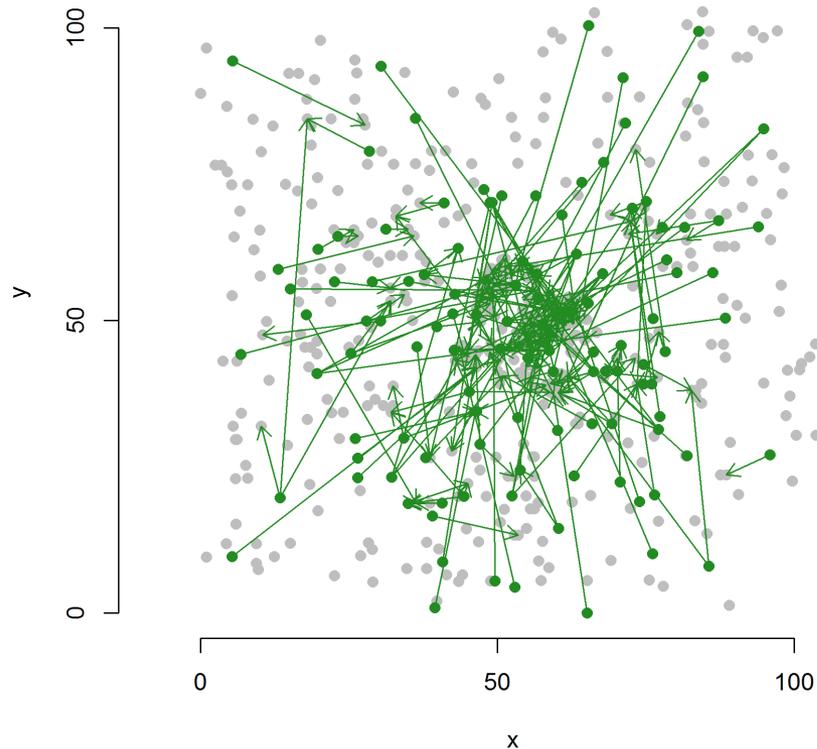
→ process-based



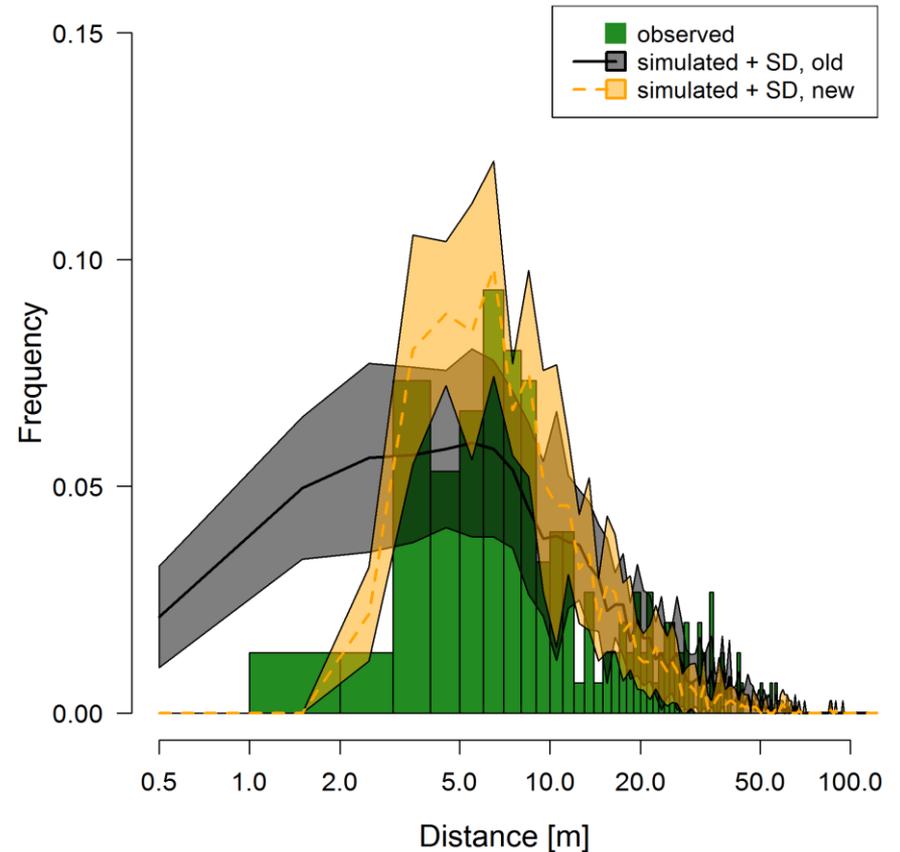
→ experiments

- plots
- transects

Local seed dispersal

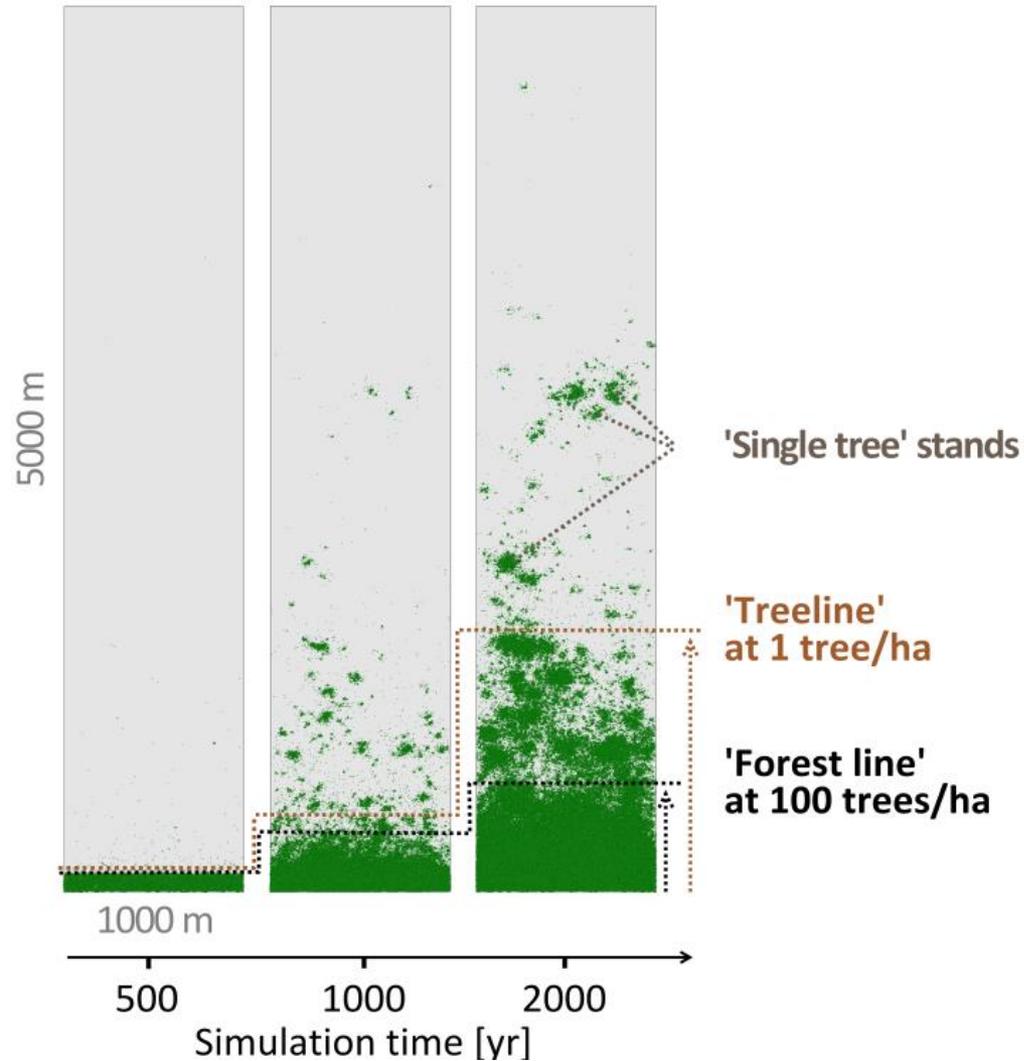


→ ~60% on-site recruitment

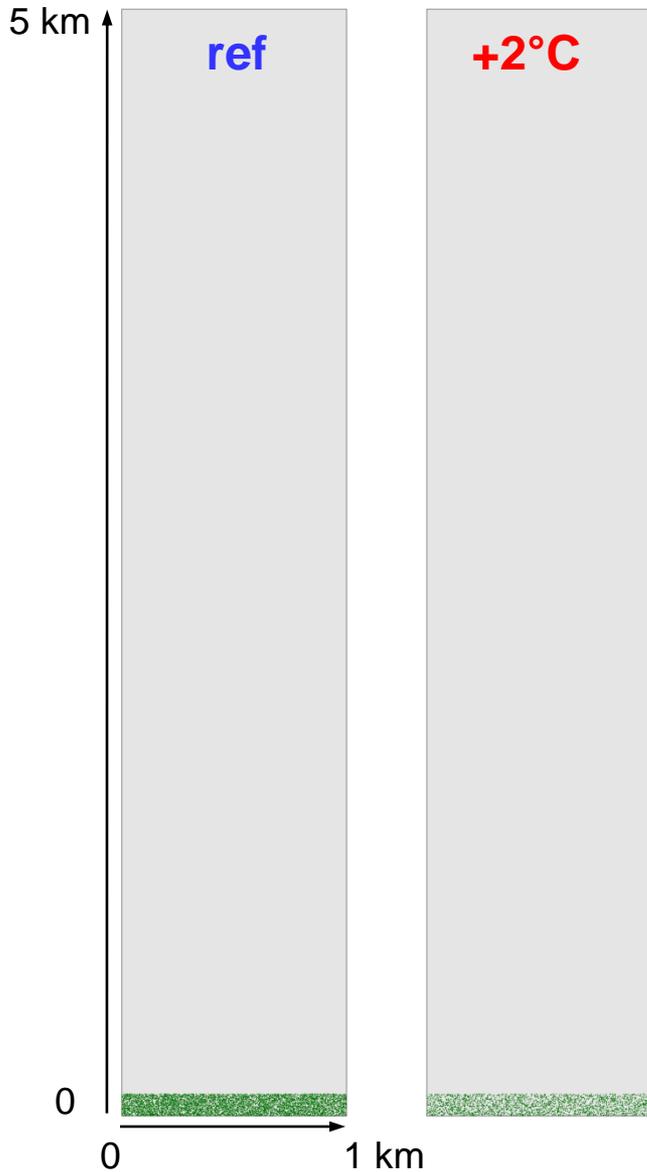


→ more realistic results
with adapted model

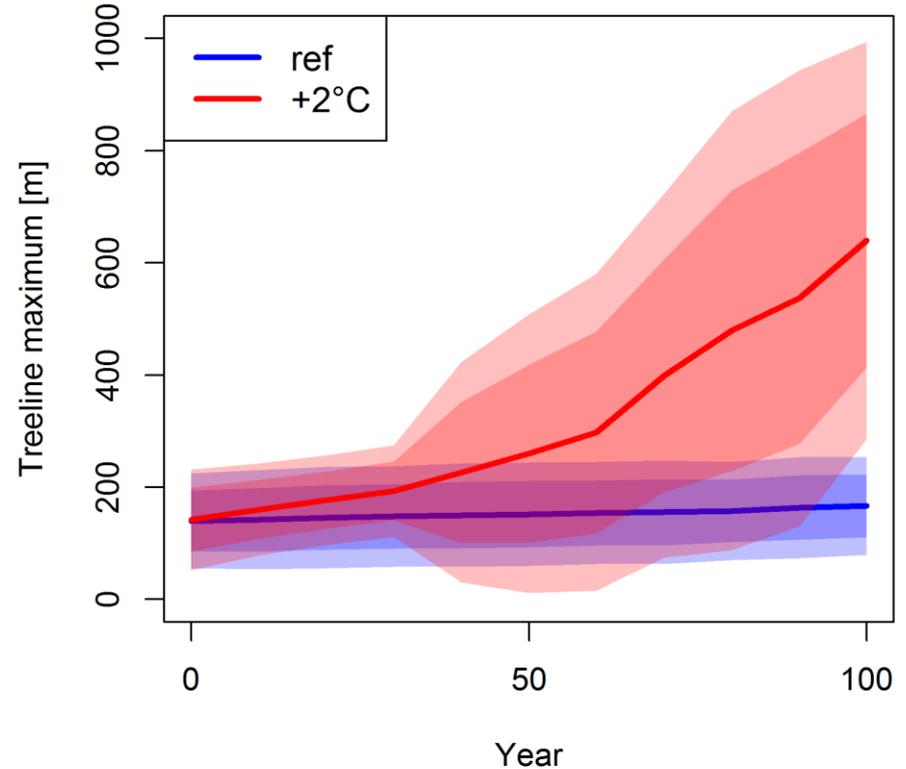
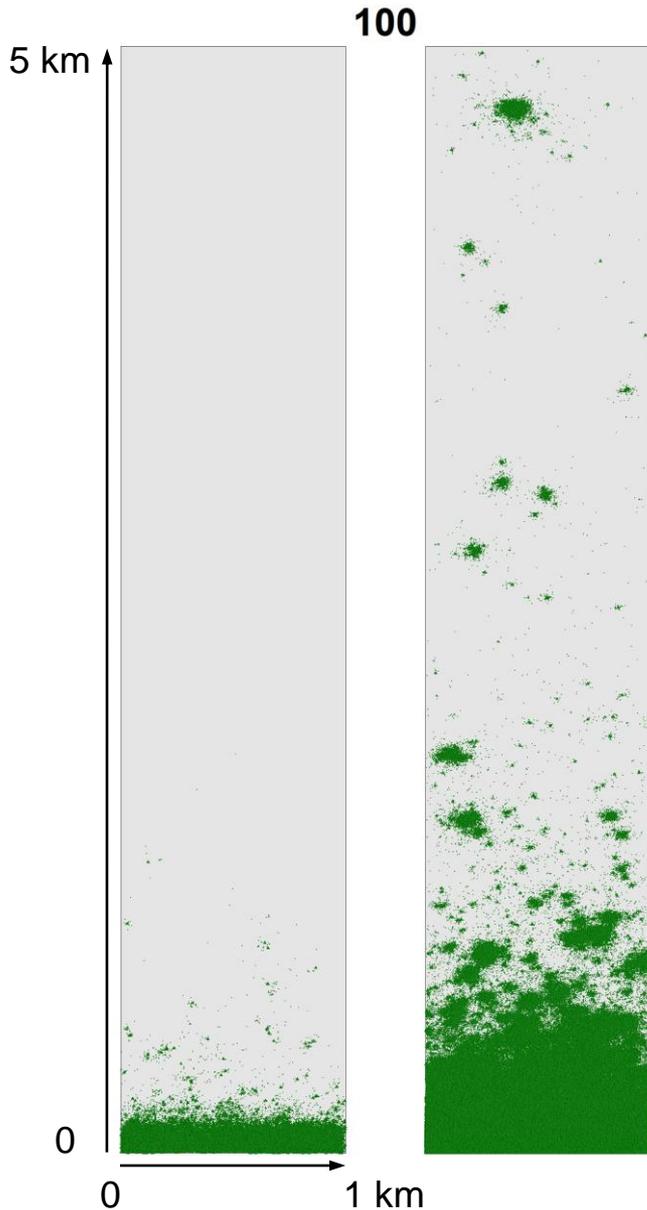
Transect simulations



Migration simulations

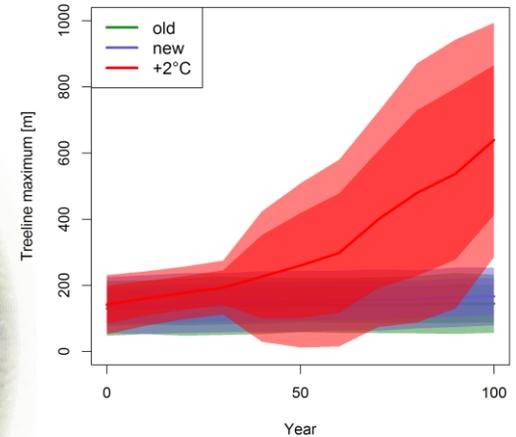
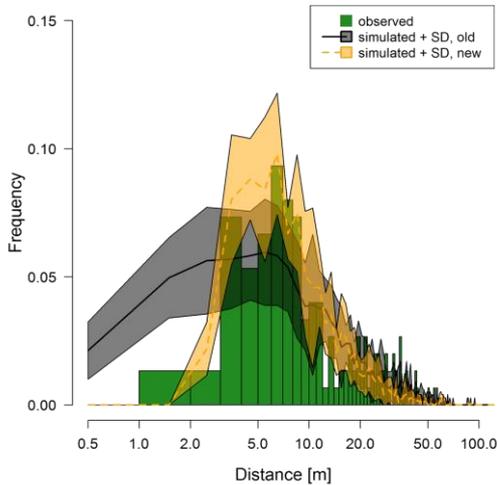


Migration simulations



- currently only slow advance (0.5 m yr^{-1})
- increased rate in higher temperatures

Conclusions



→ short seed dispersal distances

→ seed limitation hinders colonisation

→ very slow migration rate

→ lag strongly behind climate warming

References



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