Climate Change Expected to Increase Tree Growth Across Much of the North America's Boreal Forest

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From China

- The growth of North America's boreal forest is a critical regulator of carbon flux
- Climate warming is expected to disrupt boreal forest process, but its climate sensitivity and future forest growth remain poorly understood

Study Area & Dataset

- Our study area encompasses the boreal and northern temperate forest of eastern and central North America.
- We collect tree growth, stand and climate variable of the repeatedly-measured permanent sample plots (PSP)
- All PSPs follow fixed radius plot design

Fig 1. Location of permanent sample plot (green) in North America.

Method

- We apply novel machine learning technique to model non-linear climatic impacts on species-specific growth of balsam fir, black spruce, white spruce, jack pine, white birch, and trembling aspen
- Fitted species-specific models are then used to predict future growth of North America's boreal forest under changing climate

Results

- Our model projects an average +61.8% increase in the combined growth of all studies species over the next 30 year across boreal forest under RCP 8.5
- Projected growth vary by species and among regions

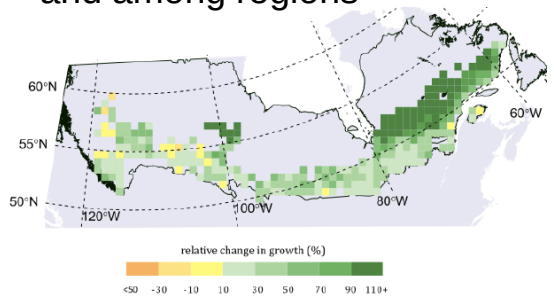

Fig 2. Overall relative changes in growth across North America's boreal forest under projected climate RCP 8.5 for 2050

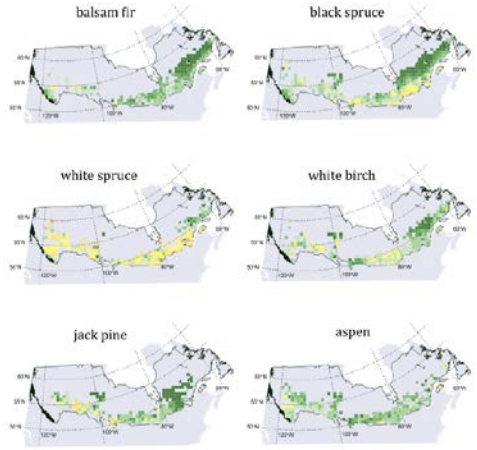

Fig 3. Species-specific relative changes in growth across North America's boreal forest under projected climate RCP 8.5 for 2050 (label in Figure 2)

Discussion: overall positive effect of climate change on tree growth across much of boreal forest in the near term

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