



Subarctic Tree Line Dynamics

Research Citation:

Variability, contingency and rapid change in recent subarctic alpine tree line dynamics; Landscape variability of vegetation change across the forest to tundra transition of Central Canada. Ryan Danby:

<https://besjournals.onlinelibrary.wiley.com/doi/10.1111/j.1365-2745.2006.01200.x>

Study Summary:

Global climate change has caused a greater increase to the average temperature in arctic and subarctic regions compared to the rest of the globe. Study explores how changing temperatures have affected expansion and population dynamics of trees and shrubs, looking specifically at the transition zone (ecotone) between forests and tundra. The study is based on the idea that increasing temperatures caused by climate change will result in trees and shrubs populating areas further North than they have in the past (tree line advancement). Tree cookies (stem samples) from white spruce and willow plants in several regions in the Southwest Yukon were analyzed to learn about current and historic plant populations. Tree cookie analysis demonstrated that tree line advancement has occurred over time, and that this advancement depends not only on average yearly temperatures, but also on topographical location and traits that are specific to the plant species. For example, Spruce trees on South facing slopes showed significant advancement but no change in density, while Spruce trees on North facing slopes did not advance in latitude but had a significant increase in density. Observations made in this study suggest a “threshold response” to climate change meaning that ecosystems will undergo periods of slow gradual change followed by rapid changes.