

Boreal Tree Response to Climate Change: Expansions and Limitations

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Abstract

This research is targeted at a better understanding of the future behavior of the boreal forest as climate is projected to change. My previous study of the vegetation history shows that the central Kenai Peninsula Lowlands underwent a number of vegetational and climatic changes since deglaciation. These shifts were related both to temperature and precipitation, and possibly related to the movement of the Aleutian Low. Documenting the history of *Picea* and *Betula* at the species level will help us understand these climatic changes. Boreal tree species fluctuate in abundance throughout the Holocene, and these changes are probably related to both temperature and precipitation. The relationship of surface pollen to modern biome composition is not well understood and varies largely with study location. For example, mountain hemlock (*Tsuga mertensiana*) appears to produce low pollen rain in comparison with other species, and higher pollen rain is expected in areas of higher precipitation. I propose to use modern vegetation plots with surface pollen samples from the Kenai Peninsula, AK to further explore the relationship of modern pollen rain to ecosystem composition and how this relationship varies with the large precipitation gradient on the Kenai Peninsula. I also will take new cores for detailed macrofossil (seeds, needles) analysis to document individual boreal species changes through time, thereby improving our understanding of the climatic shifts that took place. The new cores also have the potential of going back further in time.