



Project acronym: MicroVeg

Project title: Microhabitats as a buffer for tundra vegetation change under climate warming

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Discipline: Earth Sciences & Environment: Ecosystems & Biodiversity

Station(s): Arctic Station (Greenland/Denmark)

Rapid climate warming is expected to have widespread consequences for Arctic plant species, but observed responses to recent ambient warming often lag behind the changes predicted using space-for-time substitution or warming experiments. Local variation in microclimatic conditions across a landscape might act to buffer the impact of regional warming and thus contribute to the persistence of tundra plant communities. This could occur through several mechanisms: first, pockets of warmer microclimates might harbor communities of native Arctic species that are more thermophilic than those in the surrounding landscape. These species, rather than non-native species from outside the Arctic, could be an important source of propagules as warming proceeds. Similarly, these warm pockets could also harbor warm-adapted genotypes of the same Arctic species that occur elsewhere in the landscape. Gene flow from these populations could provide an important source of “pre-adapted” alleles that might contribute to evolutionary adaptation to warming in Arctic species.

The proposed research will explore both of these hypotheses through a combination of observational and experimental work. First, we will use thermal cameras mounted on UAVs (drones) to map microclimatic variation across the landscape near the Arctic Station. We will then conduct surveys of community composition across a gradient of temperatures in order to determine the thermal niche of each species. Finally, we will conduct a series of reciprocal transplant experiments to determine whether species and populations growing in these warmer microclimates (i.e., thermophilic species and populations) are indeed pre-adapted to warmer temperatures.