Project acronym: PAWS

Project title: Patterns of Arctic lichen and bryophyte diversity under future warming and shrub expansion

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Discipline: Earth Sciences & Environment: Ecosystems & Biodiversity

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

Concurrent with unprecedented warming rates across the Arctic, plant diversity is experiencing significant changes, including earlier phenology, northward range shifts, and community composition turnover. One of the most conspicuous tundra processes is shrub expansion, with shrub species increasing in growth and expanding their ranges. While shrubification seems to result in decreasing abundance of non-vascular plants (NVP; bryophytes and lichens), its effects on NVP diversity remain largely unknown. Bryophytes and lichens are key components in the diet of many herbivore species such as caribou and reindeer, and are essential for ecosystem regulation processes. However, these are both severely understudied species groups due to their challenging taxonomical nature. PAWS aims at describing NVP diversity patterns across the Arctic, and understanding the effect of changing vascular plant cover and climate on NVP diversity. To this end, we will collect data in Disko Island, Greenland in the summer of 2023, where we will comprehensively survey >30 plots using the point-intercept method. This project is cross-site and cross-institutional in nature, including fieldwork in Svalbard, Sweden and Canada. After data collection, we will use Bayesian statistical methods to understand the relationship of NVP diversity with the cover of vascular plants (shrubs, graminoids, forbs), habitat type and climatic conditions. A key element of PAWS is the emphasis on identifying NVP to the species level, which has been very rarely done in Arctic ecological monitoring. Thus, PAWS will provide a baseline level of NVP diversity and contribute to better understand NVP trends given continued climate change and shrubification.