

Why the top of the world is on the top of our minds

GVSU's research on the impacts of Climate Change in the Arctic



The Arctic tundra is changing

Many call it a "canary in the coal mine" when it comes to Climate Change, but Arctic scientists are well-aware that a changing tundra may be much more than a harbinger of Global Warming.

In a region of the world where temperatures may drop below freezing even during the summer it seems intuitive that warming will affect Arctic plants and animals.

What may not be as apparent is how these changes could set off a chain of events resulting in accelerated warming on a local and global scale.

Recent changes in the Arctic (within the last 30-50 years)

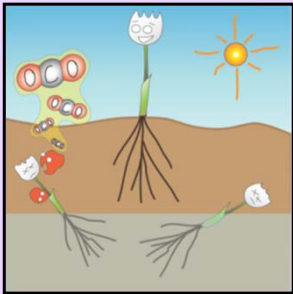
- Warmer temperatures
- Thawing permafrost
- Earlier snowmelt
- Earlier growth
- Trees and shrubs moving north



The tundra

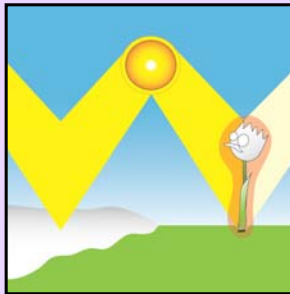
A changing tundra could have global repercussions

Greenhouse gas emissions



As the tundra's frozen ground thaws dead microbes are able to decompose dead plants releasing greenhouse gases (CO₂ and Methane) into the atmosphere. These gases trap more heat causing further warming

Accelerated warming



While snow reflects most of the light that hits it, plants absorb light and warm the area around them. This melts snow faster exposing more plants which leads to further warming.

Food-web disruption



As plants change herbivores and pollinators are affected. Because many migratory birds nest in the Arctic, changes in tundra plants may also affect other ecosystems.

Studying Arctic plants is critical

Because Arctic plants play critical roles in the three processes shown above, GVSU researchers are asking the question...

How does warming impact Arctic plants?



GVSU is studying Arctic plant responses to Climate Change

Led by Dr. Bob Hollister, GVSU's Arctic Ecology Program works to predict how tundra plants will respond to Climate Change. Their study takes place in Northern Alaska where they warm plots

of tundra vegetation with open-top greenhouses. By comparing warmed plants with others in natural conditions they hope to forecast how plants will respond to Climate Change.



GVSU AEP's 2008 field team from left to right: Dr. Bob Hollister, Jeremy May, Jean Galang, Jenny Liebig, Rob Slider

Specific study questions & preliminary answers

How does warming affect Growth & Reproduction?



Warmed plants tend to grow taller and flower earlier

How does warming affect Community Composition?



Warming tends to favor grasses, sedges & shrubs at the cost of smaller plants

What traits can we use to predict responses?



Geographic distribution and growth type may predict community responses

Acknowledgements



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This study is part of the International Tundra Experiment (ITEX), a circumpolar study investigating the impacts of Climate Change on Tundra plants.

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Further Information

Become a fan of the GVSU Arctic Ecology Program on Facebook! Or visit the lab website: <http://faculty.gvsu.edu/hollist/>

Publications on the study sites

- 2016. ABOVE AND BELOWGROUND PLANT BIOMASS RESPONSE TO EXPERIMENTAL WARMING IN NORTHERN ALASKA. *APPLIED VEGETATION SCIENCE*
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