



TEACHERS AND RESEARCHERS
EXPLORING AND COLLABORATING

Welcome to *PolarConnect*

with Bruce Taterka and Nell Kemp
at Toolik Field Station, Alaska

Tuesday 16 July 2013

11:00 a.m. AKDT

(12:00 pm PDT, 1:00 pm MDT, 2:00 pm CDT, 3:00 pm EDT)

Slides will be shown here

Exit the presentation

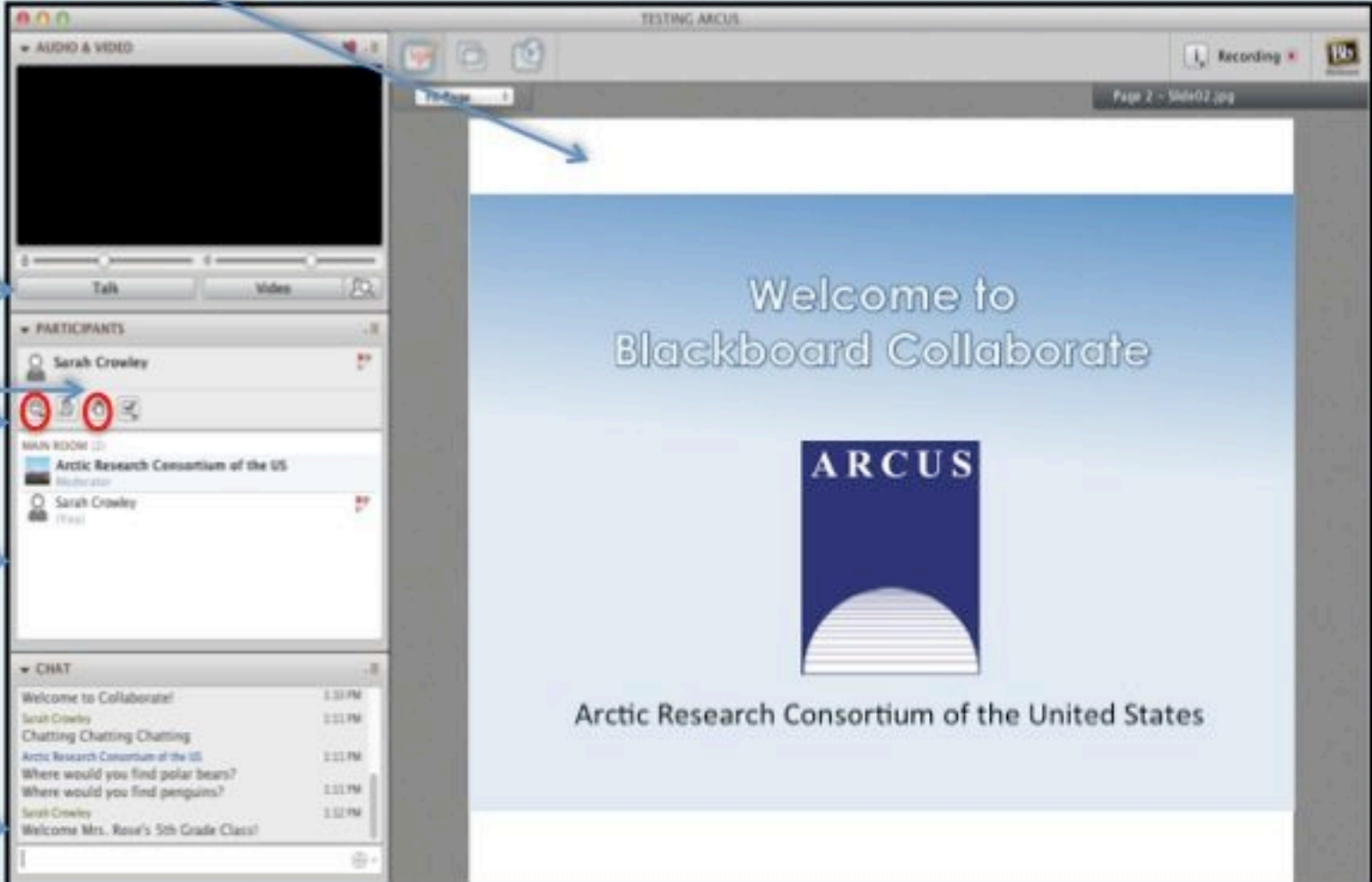
Click to Talk,
Unclick to finish talking

Raise your hand to ask a question

Share with emoticons

List of all participants

Chat with one person or the entire group



The screenshot shows the Blackboard Collaborate interface. The main window displays a presentation slide titled "Welcome to Blackboard Collaborate" with the ARCUS logo and the text "Arctic Research Consortium of the United States". The left sidebar contains several panels: "AUDIO & VIDEO" (with a black video feed), "PARTICIPANTS" (listing Sarah Crowley and Arctic Research Consortium of the US), "MAIN ROOM" (with a chat area), and "CHAT" (with a chat history). The top of the interface shows the "TESTING ARCUS" window title, a "Recording" indicator, and a "Page 2 - Slide02.jpg" label. Arrows from the text on the left point to specific elements in the interface: "Slides will be shown here" points to the top of the presentation slide; "Exit the presentation" points to the top-left corner of the main window; "Click to Talk, Unclick to finish talking" points to the "Talk" button in the "AUDIO & VIDEO" panel; "Raise your hand to ask a question" points to the hand icon in the "PARTICIPANTS" panel; "Share with emoticons" points to the emoticon icon in the "PARTICIPANTS" panel; "List of all participants" points to the list of names in the "PARTICIPANTS" panel; and "Chat with one person or the entire group" points to the chat area in the "MAIN ROOM" panel.

Please Note:

- Participants using the telephone can mute/unmute by **pressing *6** on the phone.
- Today's event will be recorded and archived.

Participant Introductions

Please type in the chat box:

- ✓ Name
- ✓ Affiliation (School, Institution, Etc.)
- ✓ The number of students and adults participating with you in the same location



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What is PolarTREC?

PolarTREC is a professional development experience in which K-12 teachers are paired with researchers for 2-6 week research experiences in the polar regions.

From 2010-2013, nearly 50 teachers from around the United States will join scientists in the Arctic and Antarctica to learn about science, the polar regions, and to share what they have learned with their students and communities.



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Questions

During the Presentation:

- Type your question in the text chat box

At the End of the Presentation:

- Raise your hand with the “hand button”.
- PolarTREC staff will call on you.
- Speak loud and clear and directly into the phone to ask your question.

Click on the Talk button to speak.

Unclick when you are done.



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Teachers: Join PolarTREC!

www.polartrec.com/about/join

Every teacher can participate in different ways:

- **Following Expeditions**
- **Participate in PolarConnect Events**
- **Join the Polar Education Email List**
- **Take Online Professional Development Courses**
- **Become a PolarTREC Teacher!**



Bruce Taterka and the Arctic Sunlight and Microbial Interactions expedition

Expeditions

Arctic Sunlight and Microbial Interactions

Overview

Ask the Team

Journals

Photos

Resources

Meet the Team

[Open All](#) | [Close All](#)

Teacher - Bruce Taterka

West Morris Mendham High School

Mendham, New Jersey

United States

Bruce Taterka teaches environmental science and theory of knowledge at West Morris Mendham High School in Mendham,



Researcher - Rose Cory

University of North Carolina Chapel Hill

Chapel Hill, North Carolina

United States

Dr. Rose Cory works in the Arctic where climate warming is thawing frozen soil which may release tremendous stores of dissolved organic



Researcher - George Kling

University of Michigan

Ann Arbor, Michigan

United States

George W. Kling is a professor in the Department of Ecology and Evolutionary Biology at the University of Michigan. He primarily



Project Information

Funded Title: Collaborative Research: Turning on the lights - Photochemical and microbial processing of newly exposed carbon in arctic ecosystems

Location: Toolik Field Station, Alaska

Start: 24 June 2013

End: 31 July 2013

Where are They?

The research team will be based out of Toolik Field Station, an 8-10 hour drive from Fairbanks, Alaska. Toolik Field Station is operated by the Institute of Arctic Biology at the University of Alaska Fairbanks and has hosted hundreds of researchers and students every year since 1975. From the field station, the team will travel to their sites by foot, truck, boat or helicopter. The weather near Toolik Lake can be wet, cold, snowy, muddy, buggy, and occasionally sunny and beautiful.



The Brooks Range near Toolik Lake, Alaska

Predatory Spiders in the Arctic Food Web 2013

[Overview](#)
[Ask the Team](#)
[Journals](#)
[Photos](#)
[Resources](#)

Meet the Team

[Open All](#) | [Close All](#)

Teacher - Nell Kemp

Kenwood Academy

Chicago, Illinois
 United States

Nell Kemp has been a science teacher since 2001, when she joined the staff of Kenwood Academy in Chicago's historic Hyde Park neighborhood. Ms. Kemp has a bachelor's degree in behavioral neuroscience from Lehigh University and a master's degree in education from DePaul University. She began teaching biology and genetics at Kenwood's high school, but moved over to Kenwood's 7th/8th grade Gifted & Talented program 4 years ago where she currently teaches environmental science and has never been happier. The enthusiasm and



Researcher - Amanda Koltz

Duke University

Amanda Koltz is a PhD candidate in ecology at Duke University under Dr. Justin Wright. Her research focuses on the relationship between community and ecosystem ecology (e.g. how species interactions can affect key ecosystem processes like decomposition and nutrient cycling). For her dissertation research, she is exploring how climate-induced changes in predatory spiders are influencing the structure and function of food webs in the Arctic. You can learn more about Amanda's research [here](#).



Project Information

Funded Title: The influence of wolf spiders on the structure and function of food webs in the Arctic.

Location: Toolik Field Station, Alaska

Start: 27 June 2013

End: 3 August 2013

Where are They?



Tundra boardwalk at Toolik Field Station, Alaska

The research team will fly to Fairbanks, Alaska and from there drive north to Toolik Field Station, in the foothills of the Brooks Range in northern Alaska. Toolik Field Station is operated by the Institute of Arctic Biology at the University of Alaska Fairbanks and has hosted hundreds of researchers and students every year since 1975.



© 2013 Google
Image IBCAO
Data SIO, NOAA, U.S. Navy, NGA, GEBCO
Image Landsat



Permafrost



Photo by Zeb Polly

PERMAFROST is made up of frozen organic matter.



Source: International Permafrost

The Arctic contains a huge amount of PERMAFROST.



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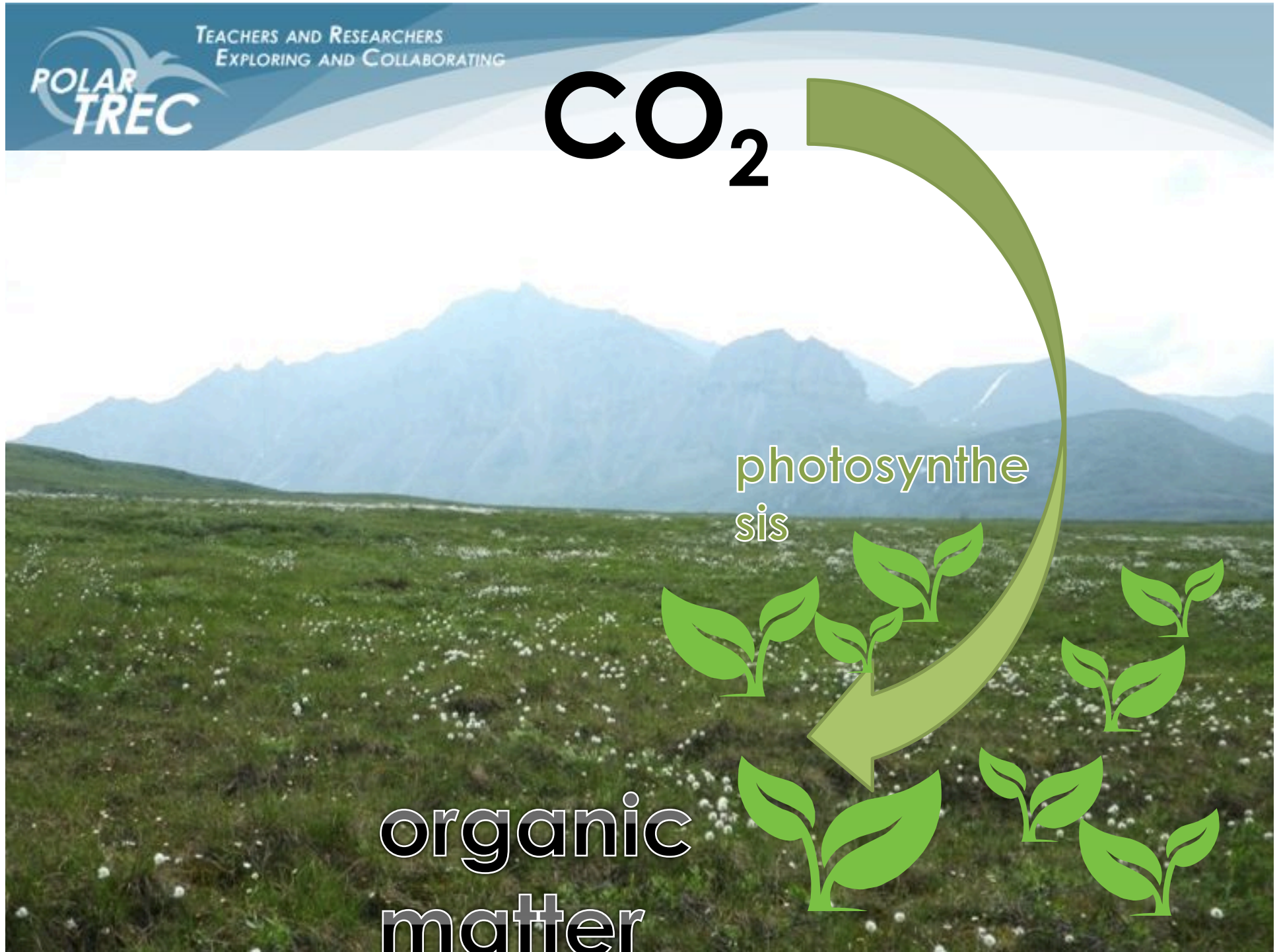
CO₂



CO₂

photosynthesis

organic
matter

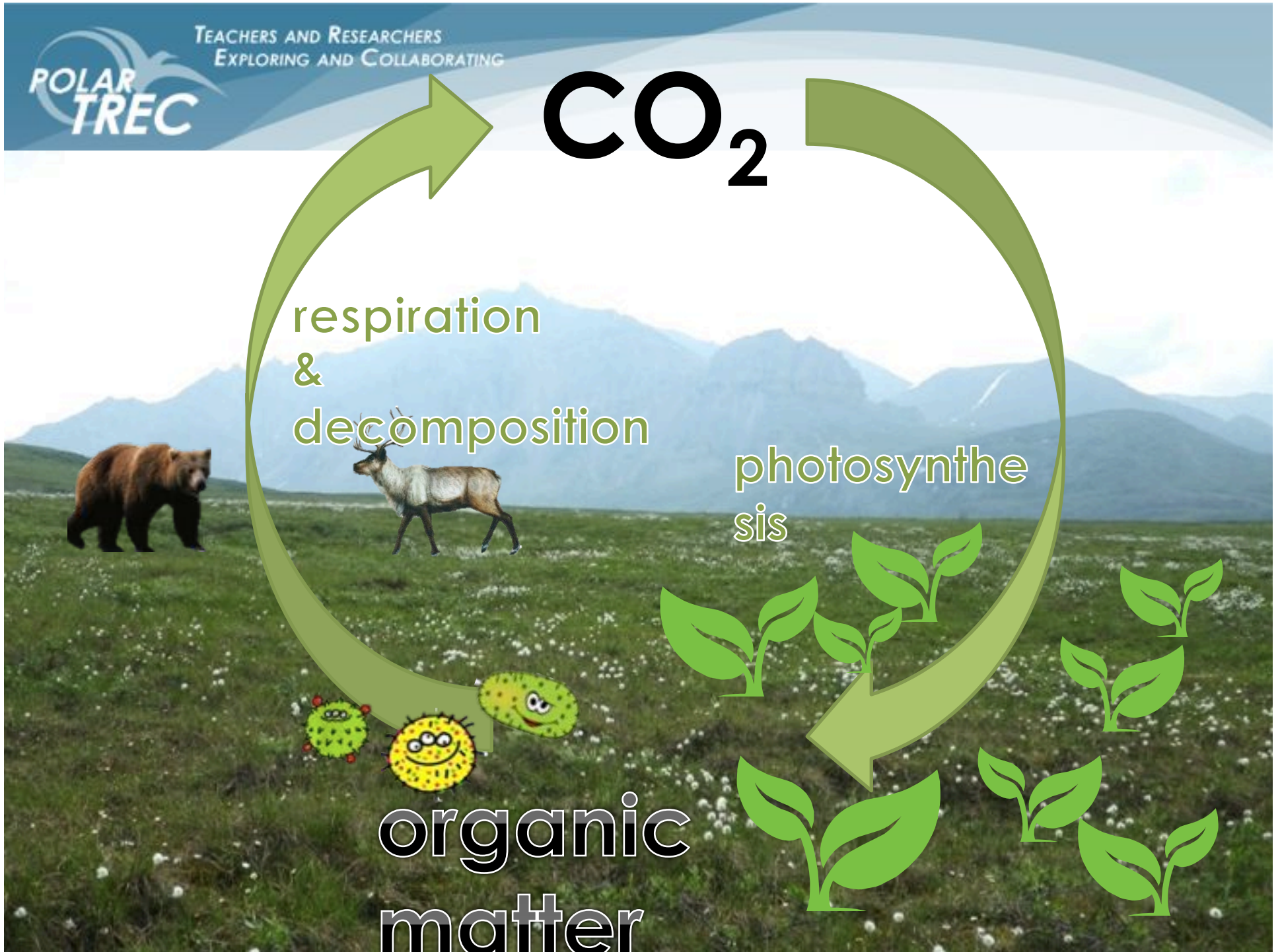


CO₂

respiration
&
decomposition

photosynthe
sis

organic
matter





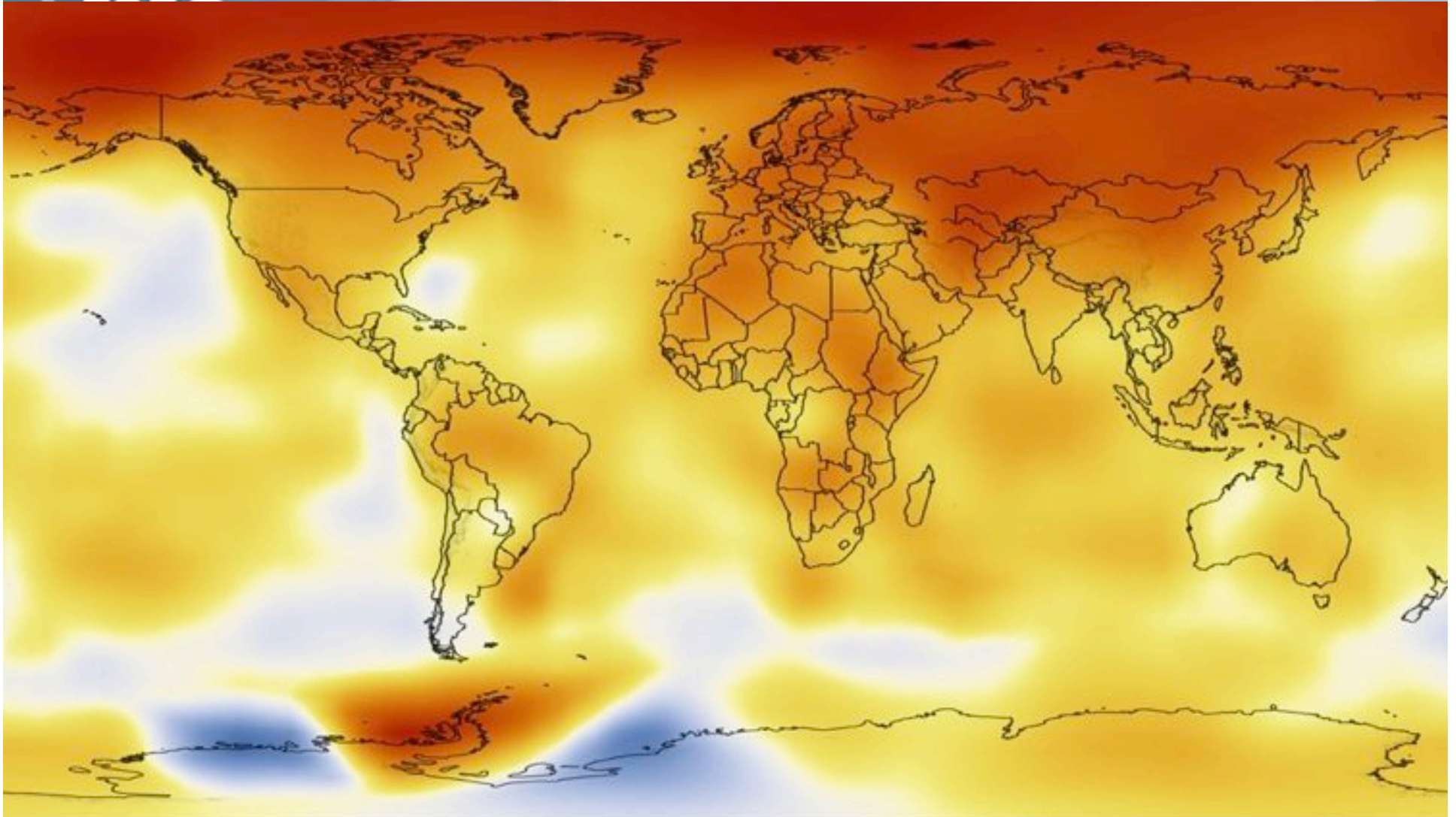
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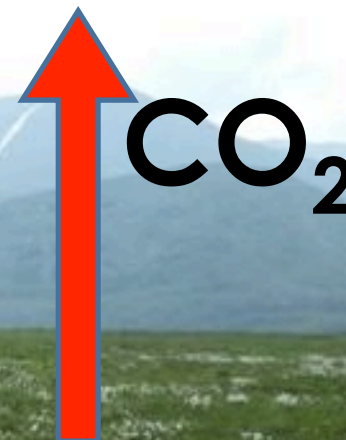
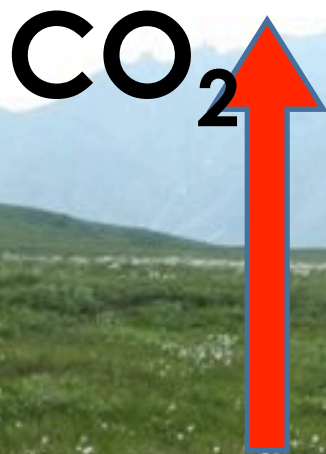
~1,600 billion tons C

organic
matter

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FOR POLAR AND GLOBAL CHANGE
POLAR

Most intense warming effects are seen in the Arctic





~1,600 billion tons C

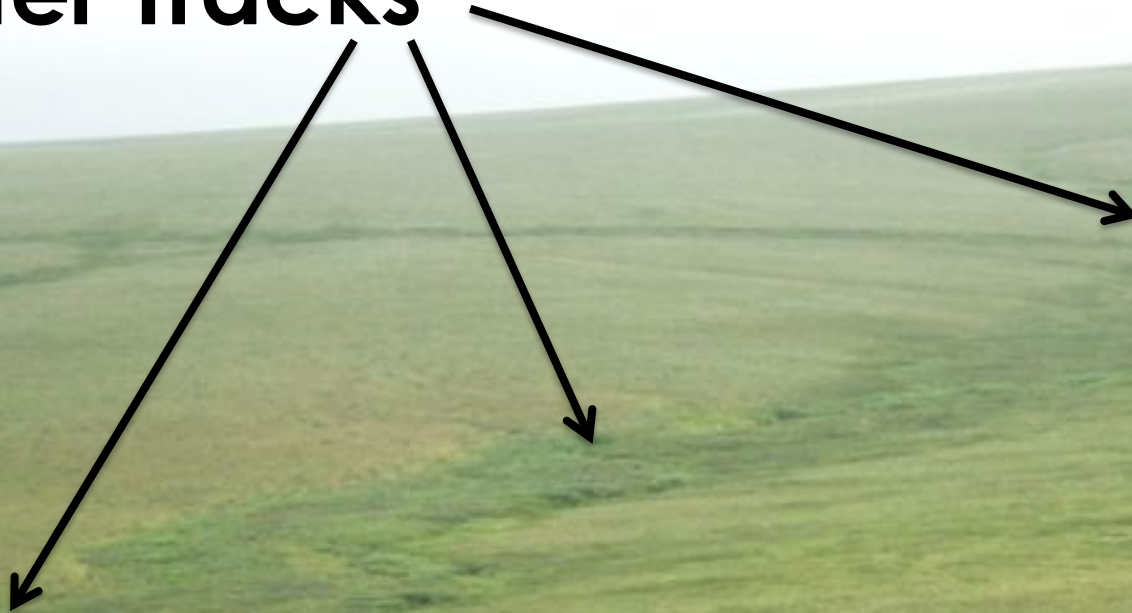


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What happens to C from thawing permafrost?

~1,600 billion tons C

Water Tracks



Testing Soil Water



Ponds & Wetlands



Measuring CO₂ and methane flux



Sampling headwaters rivers



Sampling headwaters lakes



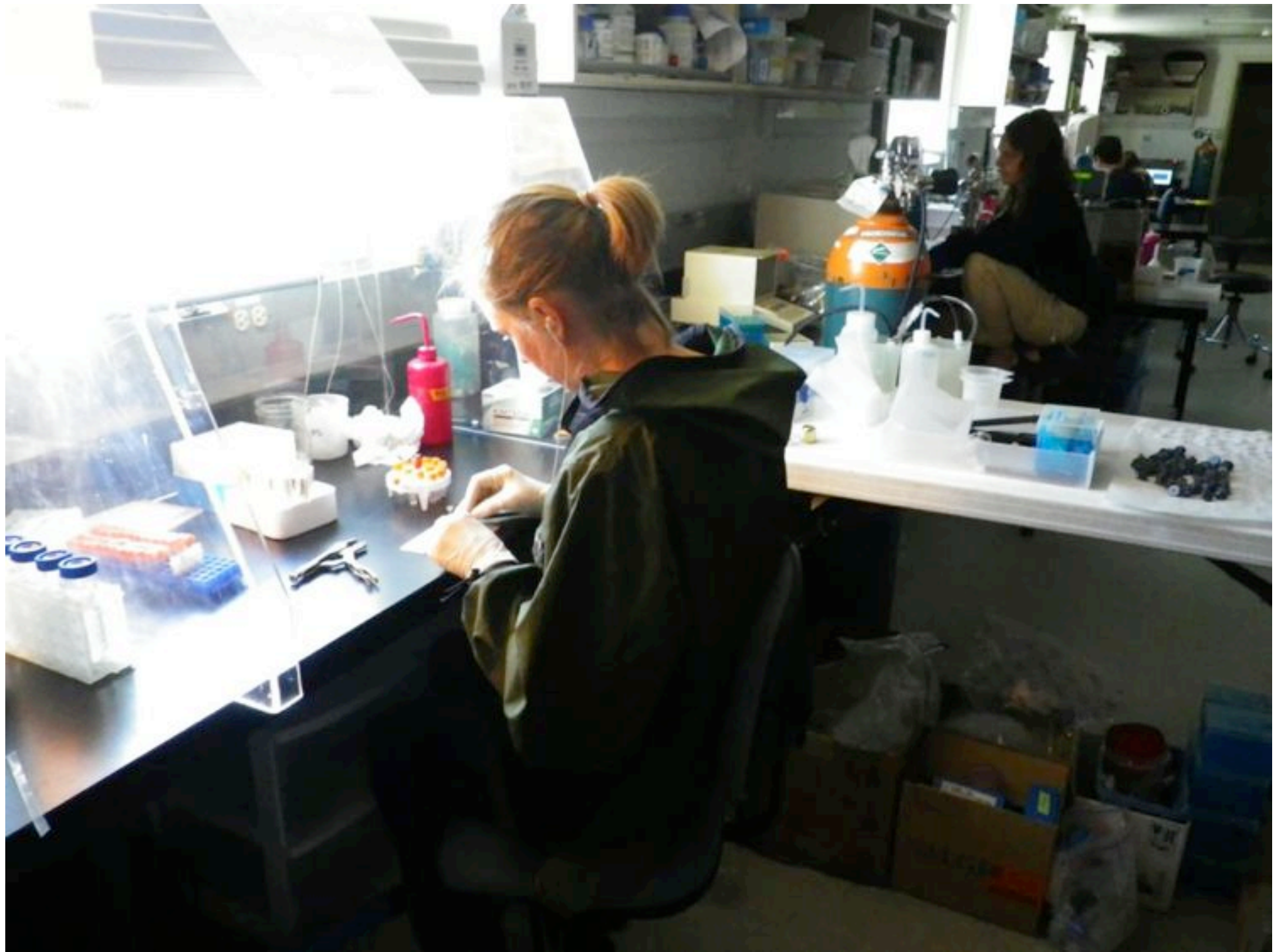
Sampling coastal plain lakes



Importance of Microbes







Effect of Sunlight

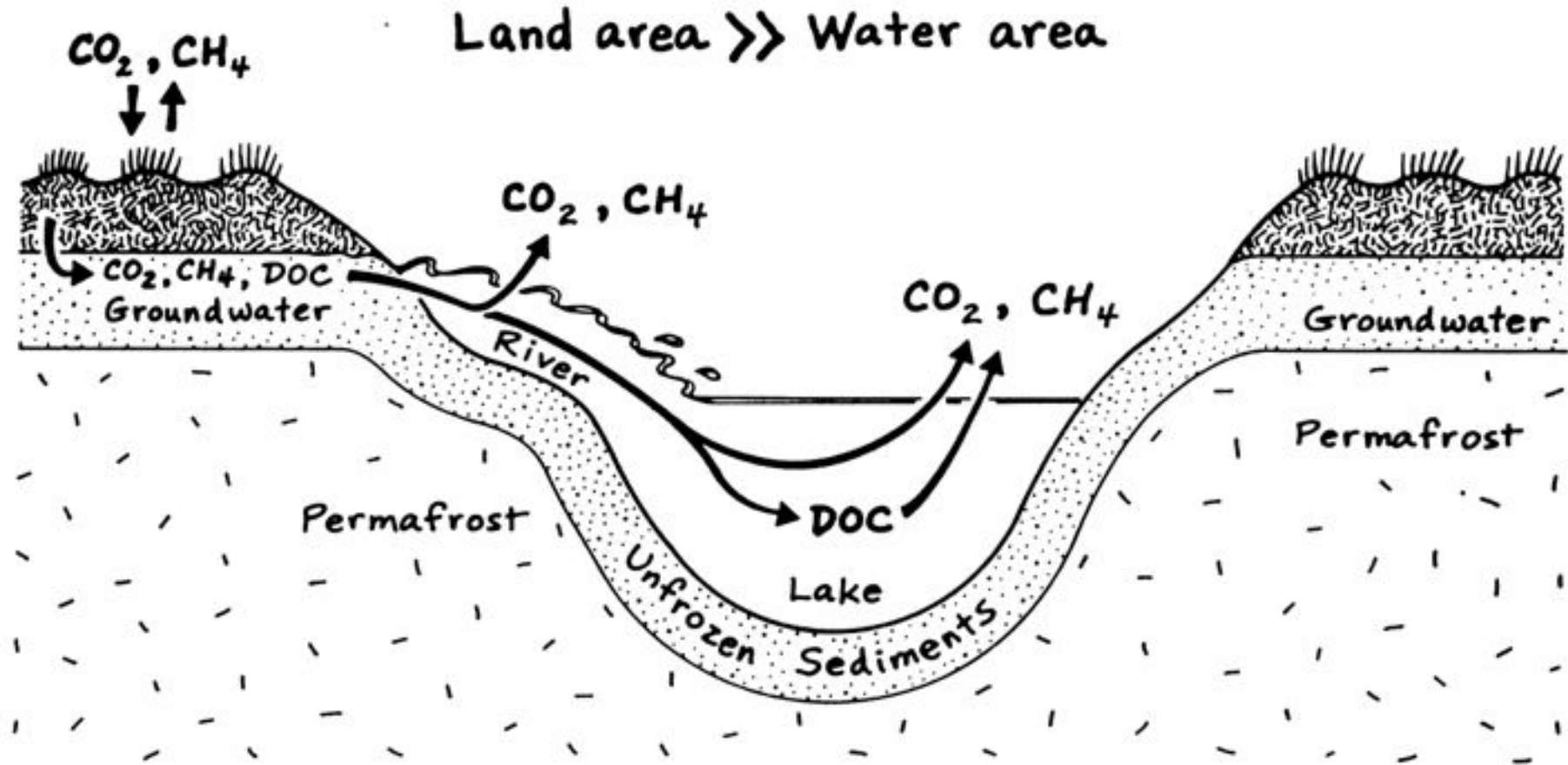




Arctic Carbon Balance

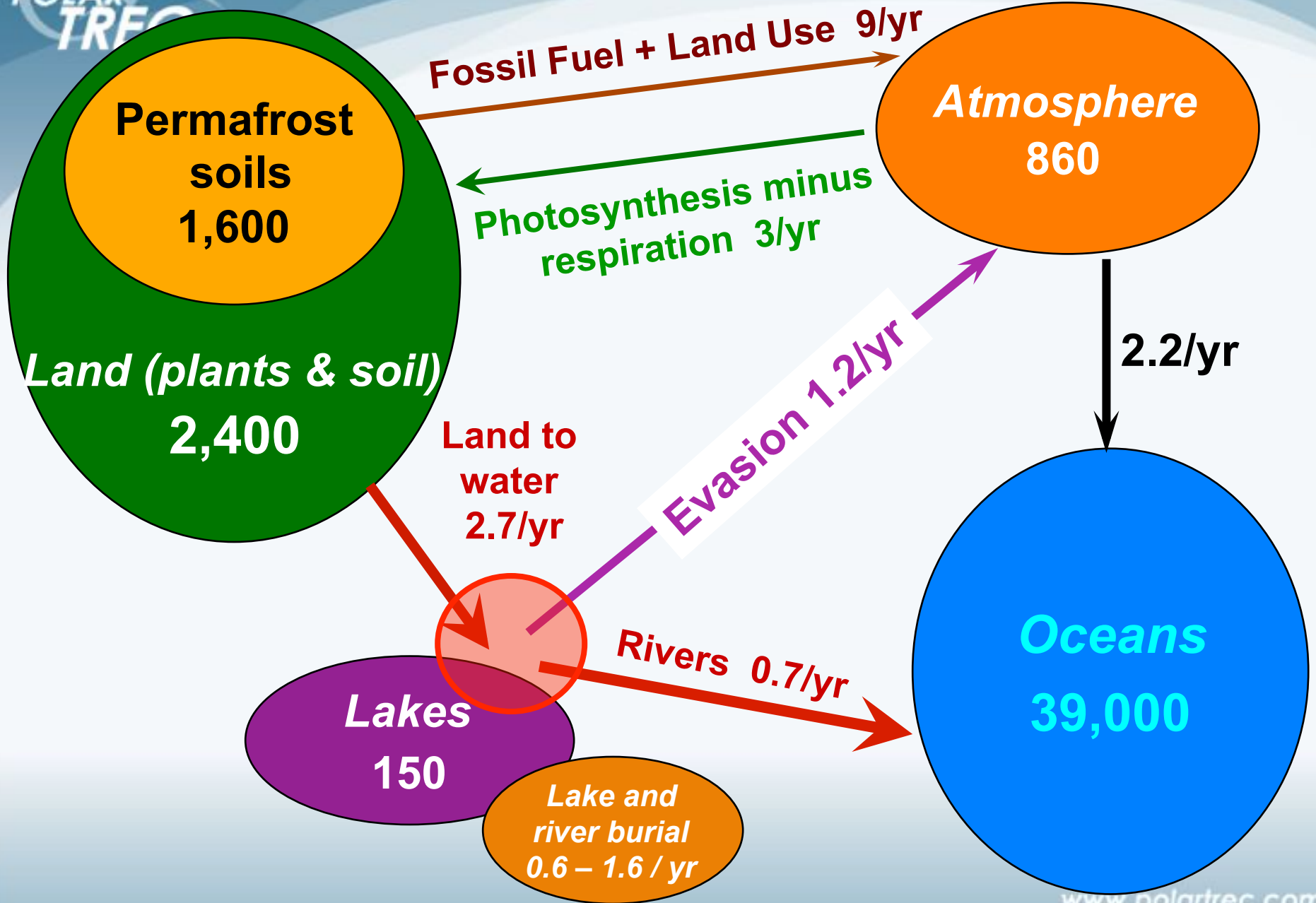
On Land: 10 – 30 g C/m²/yr storage

Freshwater: 20 – 30 g C/m²/yr loss



Global Carbon Cycle

Numbers are in billions of tons of C





Predatory Spiders in the Arctic Food Web

Amanda Koltz, Duke University

Nell Kemp, PolarTREC Teacher

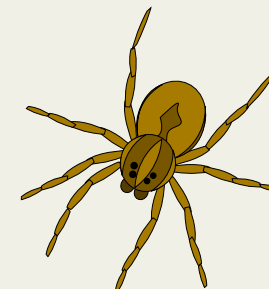
Kiki Contreras, Research Assistant

Sarah Meierotto, Research Assistant





Team Spider

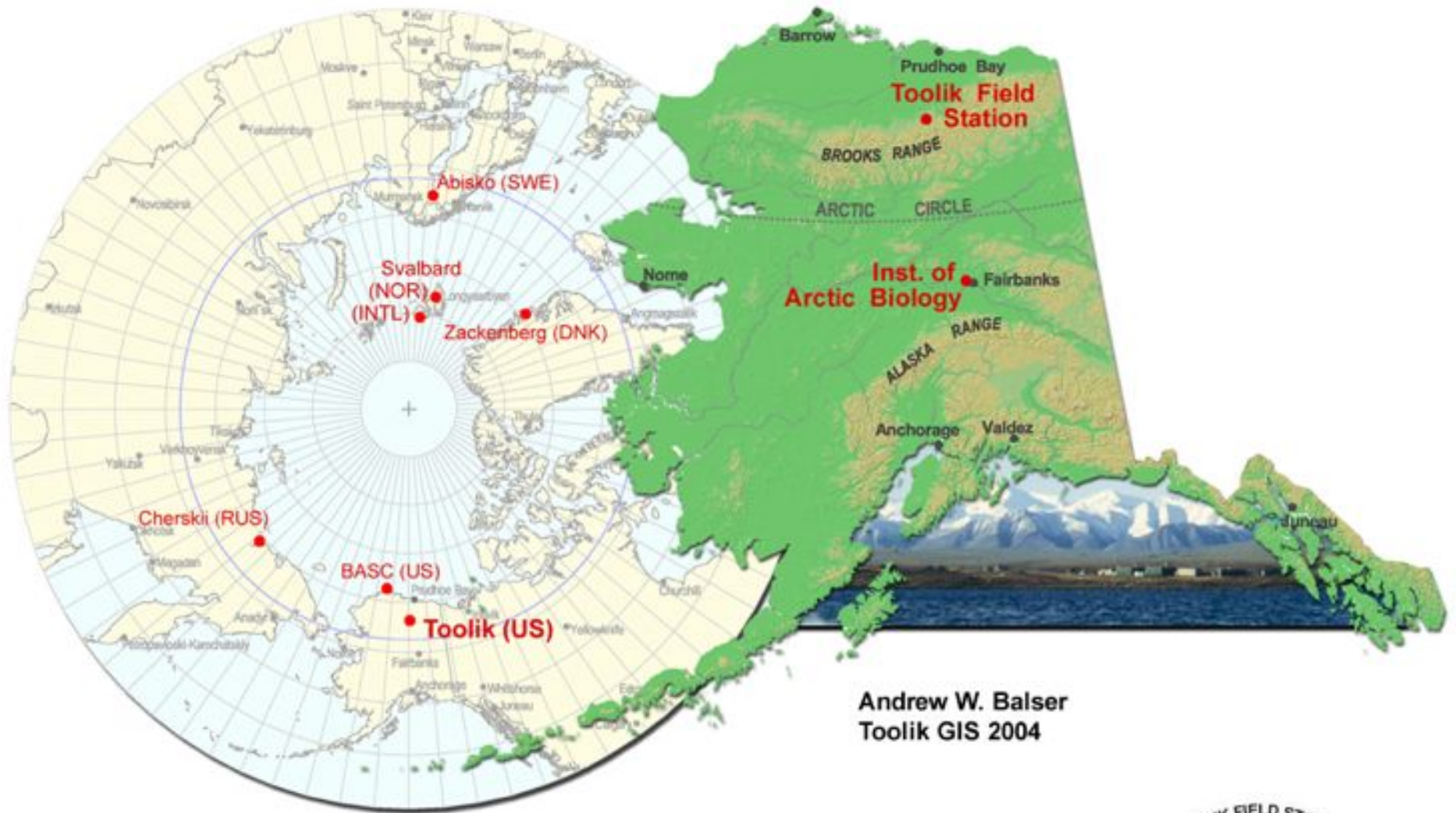


Nell Kemp, 2013



Kiki Contreras & Amanda Koltz, 2013





Andrew W. Balser
Toolik GIS 2004





What are we studying?



The background features a central area with overlapping, semi-transparent blue and teal geometric shapes that create a sense of depth and movement. This central area is framed by horizontal bands of a light yellow or cream color at the top and bottom.

Why spiders?

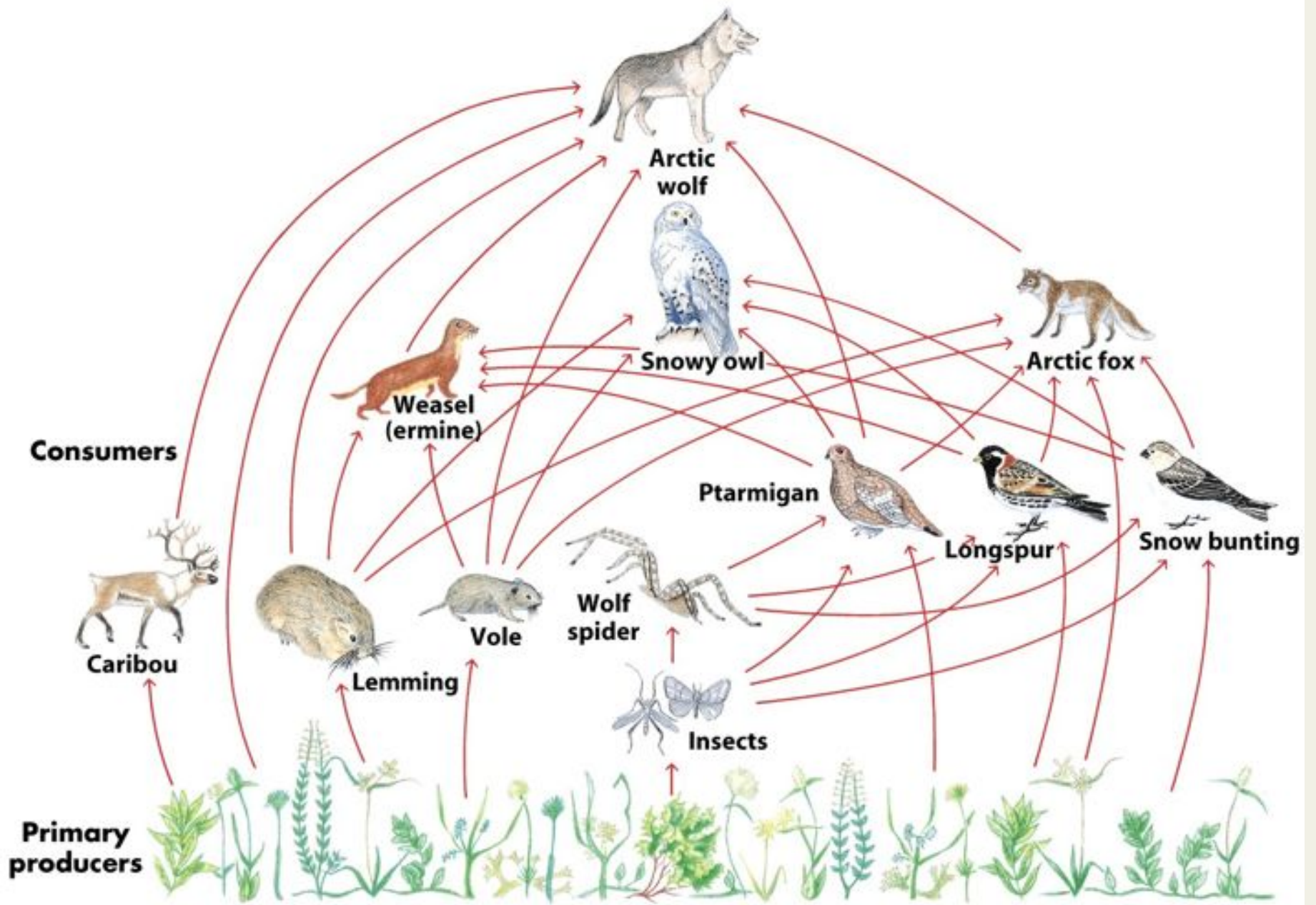


Figure 31-1
 Biology of Plants, Seventh Edition
 © 2005 W. H. Freeman and Company

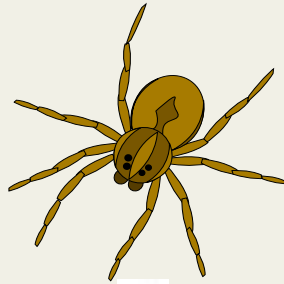
What are some of the things
spiders eat?



Where do those organisms live?



Wolf spider



Soil animals



Bacteria / fungi



Plant litter /
Permafrost carbon



What happens to the rate of decomposition if we have more or less spiders?

Why spiders?

NATIONAL GEOGRAPHIC NEWS

REPORTING YOUR WORLD DAILY

[MAIN](#) [ANIMAL NEWS](#) [ANCIENT WORLD](#) [ENVIRONMENT NEWS](#) [CULTURES NEWS](#)

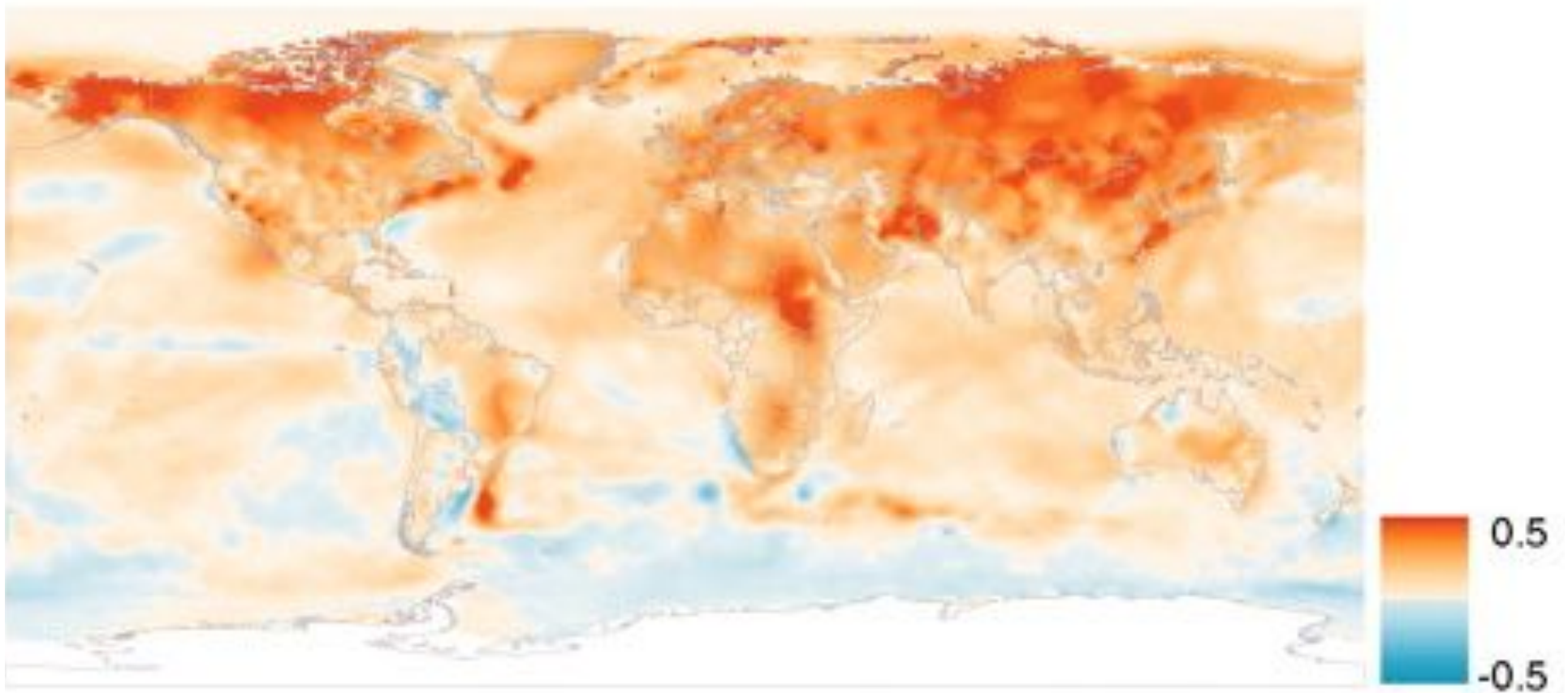
Spiders Getting Bigger -- Global Warming to Blame?

Matt Kaplan
for [National Geographic News](#)
May 5, 2009

As if [global warming](#) isn't giving us enough to worry about, now scientists say it could lead to bigger—and possibly more—spiders of at least one species.

The background features a central area with overlapping, semi-transparent blue and teal geometric shapes that create a sense of depth and movement. This central area is framed by solid yellow horizontal bars at the top and bottom.

Why the Arctic?



Temperature change ($^{\circ}\text{C}/\text{decade}$)

Trends in land and ocean temperatures for 1960–2009, with latitude medians (red, land; blue, ocean).

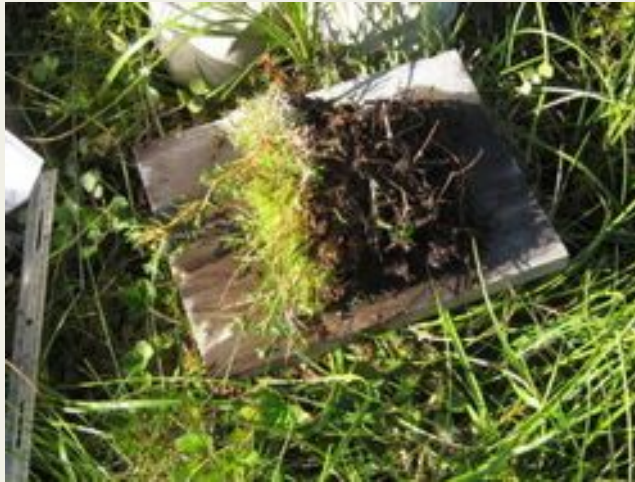
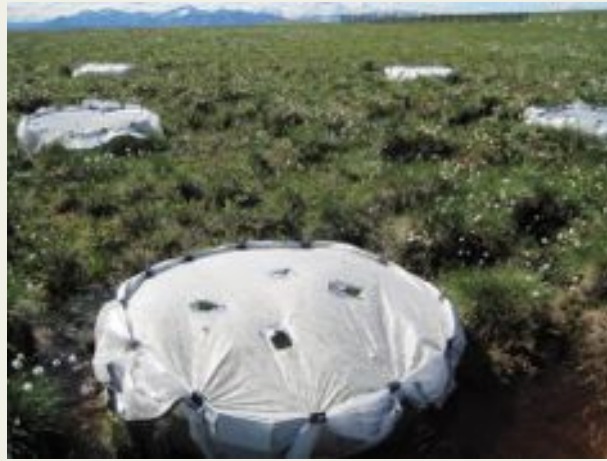
Burrows et al 2011



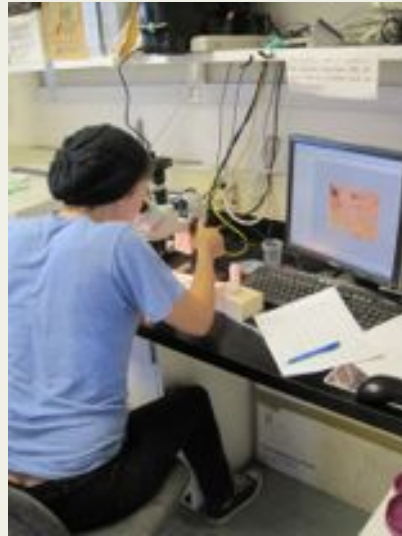
Again...why?

- Wolf Spiders are a major predator in this ecosystem
- Some of the organisms they eat are detritivores
- Spiders have an indirect relationship with the release of stored carbon from permafrost
- As temperatures change, more permafrost thaws...

How do we study them?



How do we study them?



There are always more questions that arise during research



Thank you!





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Upcoming Events

Watch for and register for upcoming events at [www.polartrec.com!](http://www.polartrec.com)

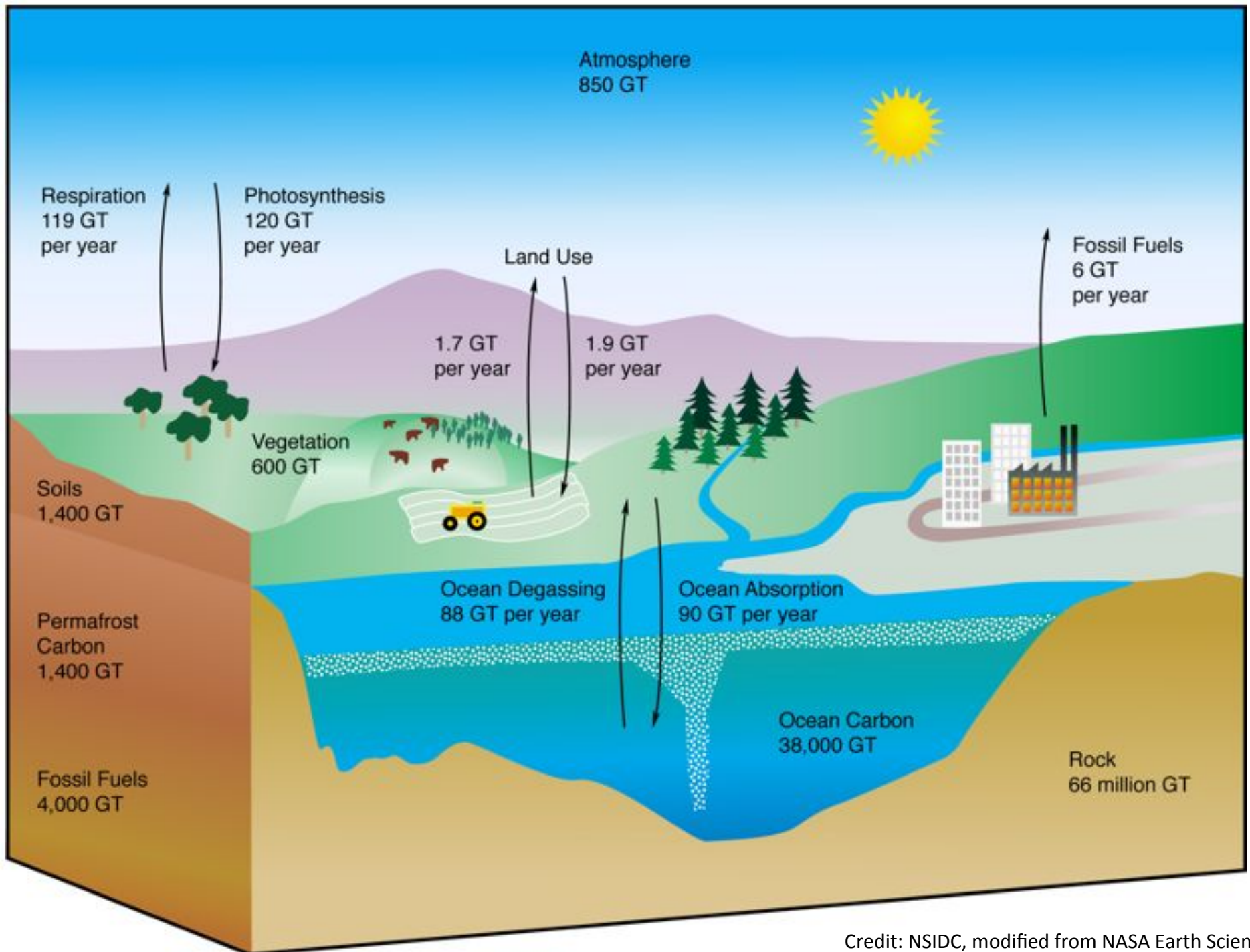


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Thank You!

An archive of the event will be available shortly.
<http://www.polartrac.com/polar-connect/archive>





Credit: NSIDC, modified from NASA Earth Science







