



International Polar Day  
**Land & Life**



[www.ipy.org](http://www.ipy.org)

# Welcome to Live from IPY!

## *International Polar Day: Land & Life*

Wednesday, 18 June 2008





# Welcome to HorizonWimba



Arctic Research Consortium of the United States

List of all participants

Raise your hand to ask a question

Return to the lobby or exit

Slides will be shown here

If using VOIP, press here to talk

'Chat' with one person or the entire group

The screenshot shows a Wimba webinar interface. At the top, a large blue banner displays the text 'Welcome to HorizonWimba' and the ARCUS logo. Below the banner is a toolbar with icons for 'TALK', audio, video, and other functions. A chat window on the left shows a conversation between participants. On the right, a 'People (3)' list shows names like 'Janet\_Warburton', 'ronnie', and 'tina'. At the bottom, a 'Main Room' chat input field is visible. Several red circles highlight specific UI elements: the 'TALK' button, the chat input field, a dropdown arrow in the 'People' list, and the 'Exit - Lobby - Help' menu item.

**Please note:** Today's event will be recorded and archived at [www.polartrec.com](http://www.polartrec.com).





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[www.ipy.org](http://www.ipy.org)

## Event Participation Roll Call

*Please say "here" when your name/organization is called.  
Please tell us how many students and how many adults are  
participating in the event from your location.*

*Thank You!*





# Agenda

- Welcome, Introduction, and Roll Call
- What is the International Polar Year (IPY)
- Upcoming IPY Days
- IPY Focus Day: Land & Life
  
- Presentation Overview & Guest Introductions
- Vladimir Romanovsky – “Permafrost”
- Elizabeth Eubanks & Steve Oberbauer – “Tundra”
- Cameron Wobus – “Coastal Erosion”
- Jenny Baeseman – “Land & Life in Antarctica”
  
- Question & Answer Session
- Upcoming Events





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[www.ipy.org](http://www.ipy.org)

# International Polar Year (IPY)

The International Polar Year (2007-2009) is an exciting scientific campaign focusing on the world's polar regions!

IPY is a time for discovery, science, learning, and awareness about the polar regions with activities for youth, scientists, and the public.

**[www.ipy.org](http://www.ipy.org)**



*Sea Ice Day -  
12 September 2007*

*IPY Launch -  
1st March 2007*

[www.ipy.org](http://www.ipy.org)



*Changing Earth Day -  
12 March 2008*

*Ice Sheet Day -  
13 December 2007*





***Land and Life -  
18 June 2008***

[www.ipy.org](http://www.ipy.org)



Thanks for Participating,  
Please launch a virtual balloon



[www.ipy.org](http://www.ipy.org)

*Land and Life*





[www.ipy.org](http://www.ipy.org)

**People -  
24 September 2008**





What is it like living in the Arctic?

find out more with:

- live radio connections
  - global classroom debates
    - activities
    - stories
- and much more!

[www.ipy.org](http://www.ipy.org)

*People -  
24 September 2008*



# *Above the Poles - December 2009*



[www.ipy.org](http://www.ipy.org)



An aerial photograph showing a vast, dense colony of penguins, likely in Antarctica. The penguins are packed closely together, forming a textured, dark pattern against the lighter, snow-covered ground. The perspective is from directly above, looking down on the colony.

***Polar Oceans Day -  
March 2009***

[www.ipy.org](http://www.ipy.org)





**Land and Life -  
18 June 2008**



**People -  
24 September 2008**



**Above the Poles -  
December 2009**



[www.ipy.org](http://www.ipy.org)



**Polar Oceans Day -  
March 2009**





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# Land & Life

Polar landscapes and polar terrestrial ecosystems extend from southern cold maritime islands to dry continental deserts in Antarctica, and from tree line across the continental tundra to remote northern islands in the Arctic. Ice, in the forms of permafrost, snow, and ice cover, plays a dominant role in all these environments, and the biological communities survive through remarkable adaptations and extensive migration. Polar ecosystems also survive in alpine areas. The climatological and ecological pressures that act on mountain-top populations also act on the northern-most and southern-most ecosystems.

Permafrost – Hydrologic Systems – Vegetation – Birds & Animals  
– Coastal Environments – Polar Extreme Environments





## International Polar Day Land & Life



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# Who are we talking with today?



**Researcher**

**Vladimir Romanovsky**  
University of Alaska  
Fairbanks



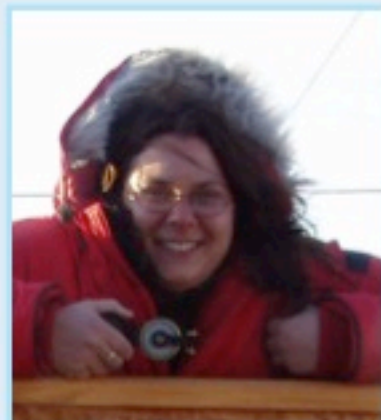
**Researcher**

**Cameron Wobus**  
University of Colorado



**PolarTREC Teacher**

**Elizabeth Eubanks**  
St. Marks Catholic  
School



**Researcher**

**Jenny Baeseman**  
McMurdo Dry Valleys  
LTER Investigator,  
IARC/APECS/ARCUS





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[www.ipy.org](http://www.ipy.org)



# Vladimir Romanovsky

## **Professor**

University of Alaska Fairbanks  
Department of Geology &  
Geophysics

Fairbanks, Alaska





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[www.ipy.org](http://www.ipy.org)

Calling in from:

Fairbanks, Alaska





# Questions to be addressed:

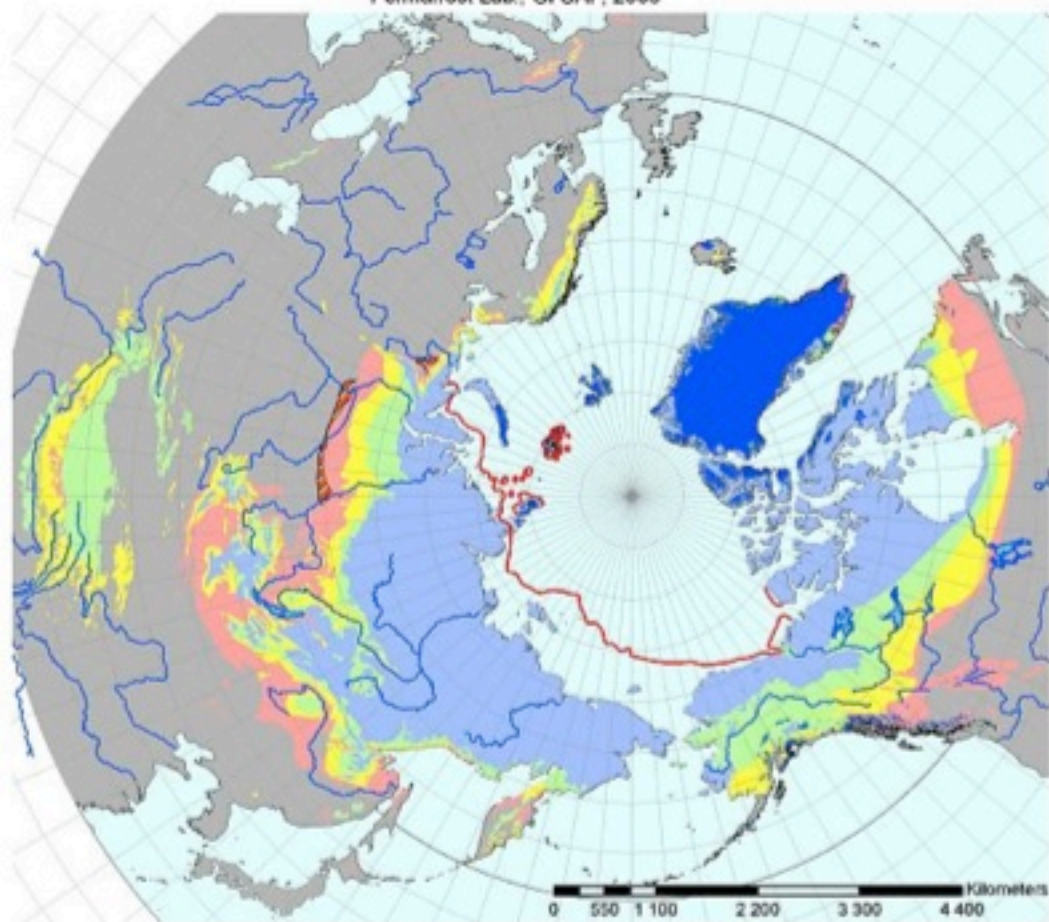
- What is Permafrost?
- Why is it important?
- Is Permafrost changing?





# Circumpolar permafrost extent

Permafrost Lab., GI UAF, 2003



## Legend

### Permafrost extent

- Continuous (90-100% of area)
- Discontinuous (50-90% of area)
- Sporadic (10-50% of area)
- Isolated (0-10% of area)

### Subsea cryosphere

- Subsea permafrost limit

### Relict permafrost

- Relict permafrost

### Geographic objects

- Glaciers
- Lakes
- Ocean and Seas
- Land
- Rivers
- 10 x 10 Degree Graticule

This map was prepared by using an electronic version of the "Circum-Arctic Map of Permafrost and Ground-ice Condition", J. Brown, O. J. Ferrians, Jr., J. A. Heginbottom, & E. S. Melnikov, 1997, U.S. Geological Survey, ISBN 0-607-89745-1.





# Ice Complex

80% Ice content

10 to 60 m thick

Covered with thin silty layer so-called  
"Protection Layer"

Occupies ~10 to 30%  
in East Siberia and  
Alaska



Photo by M. Grigoriev







# Living on Permafrost

















# Living on Permafrost





# Living on Permafrost





Just one “local” example:



20 years ago these oil tanks were  
60 m away from the coast of Pechora Sea  
(Ogorogov, 2003)

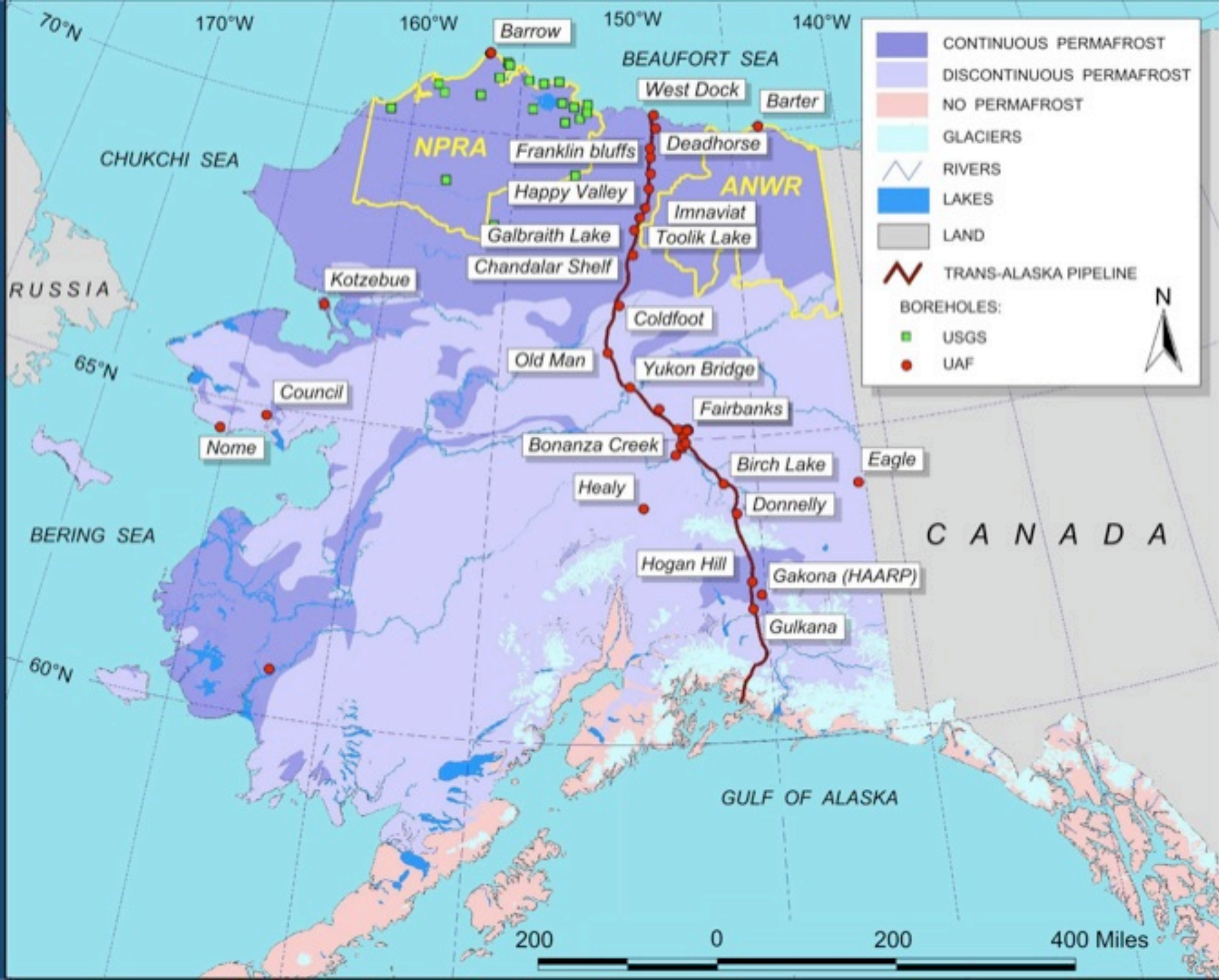


## ... The carbon cycle over land...

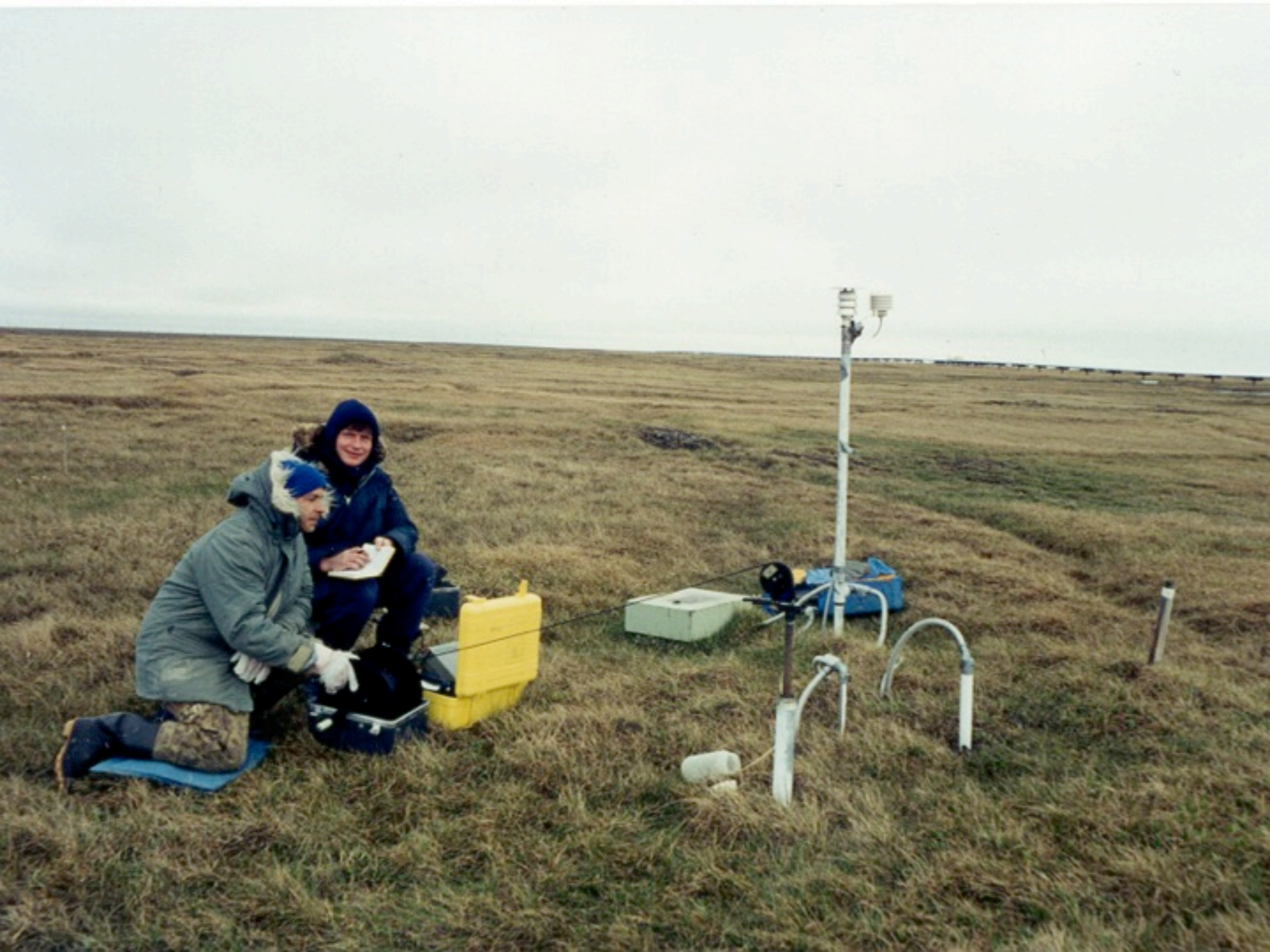


In the area of "wet thermokarst" formation, new and significant sources of  $\text{CH}_4$  production will be developing. There will be a considerable difference in greenhouse production from degrading permafrost depending on a different type of substrate and soil carbon quantity and quality.



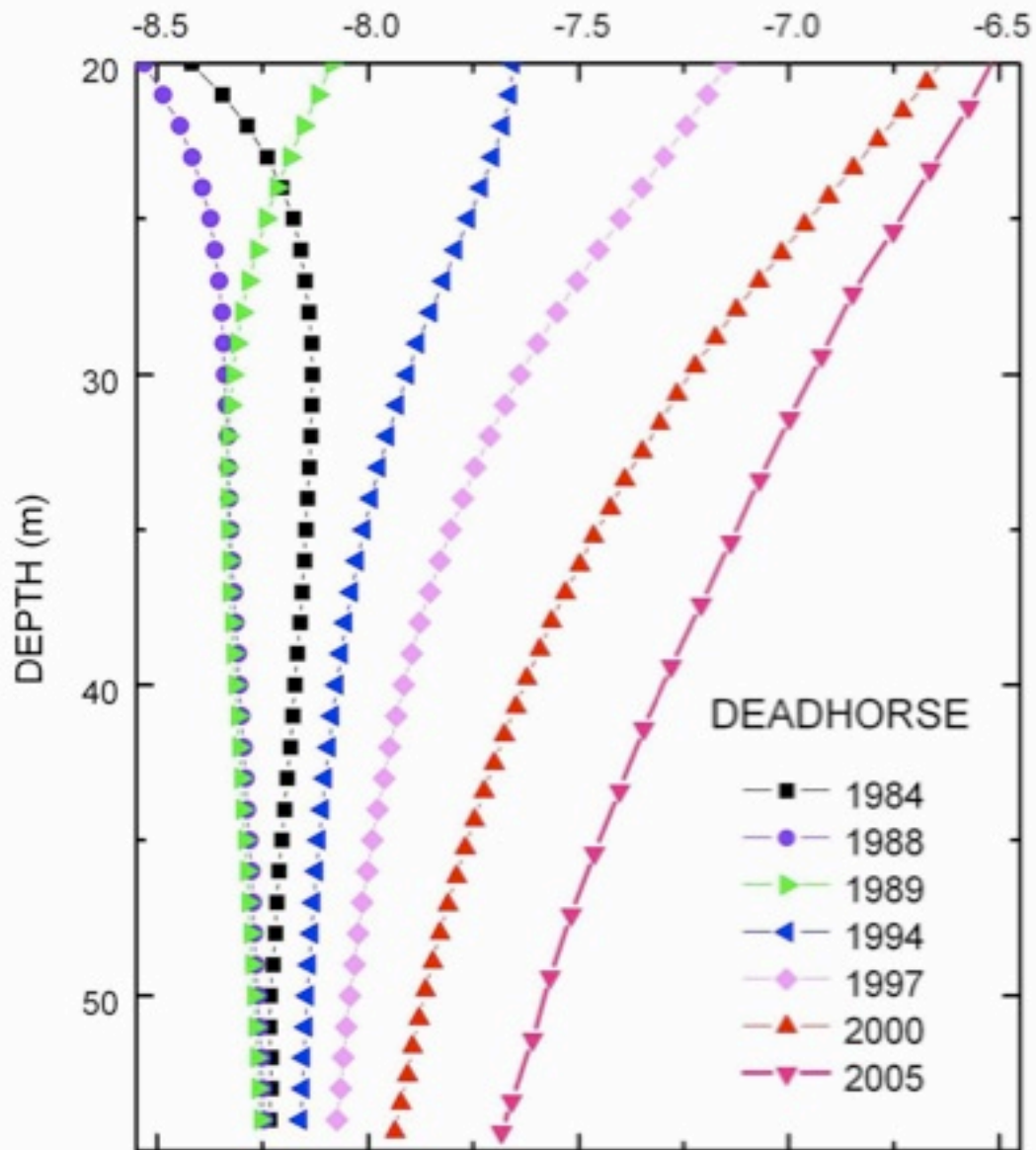






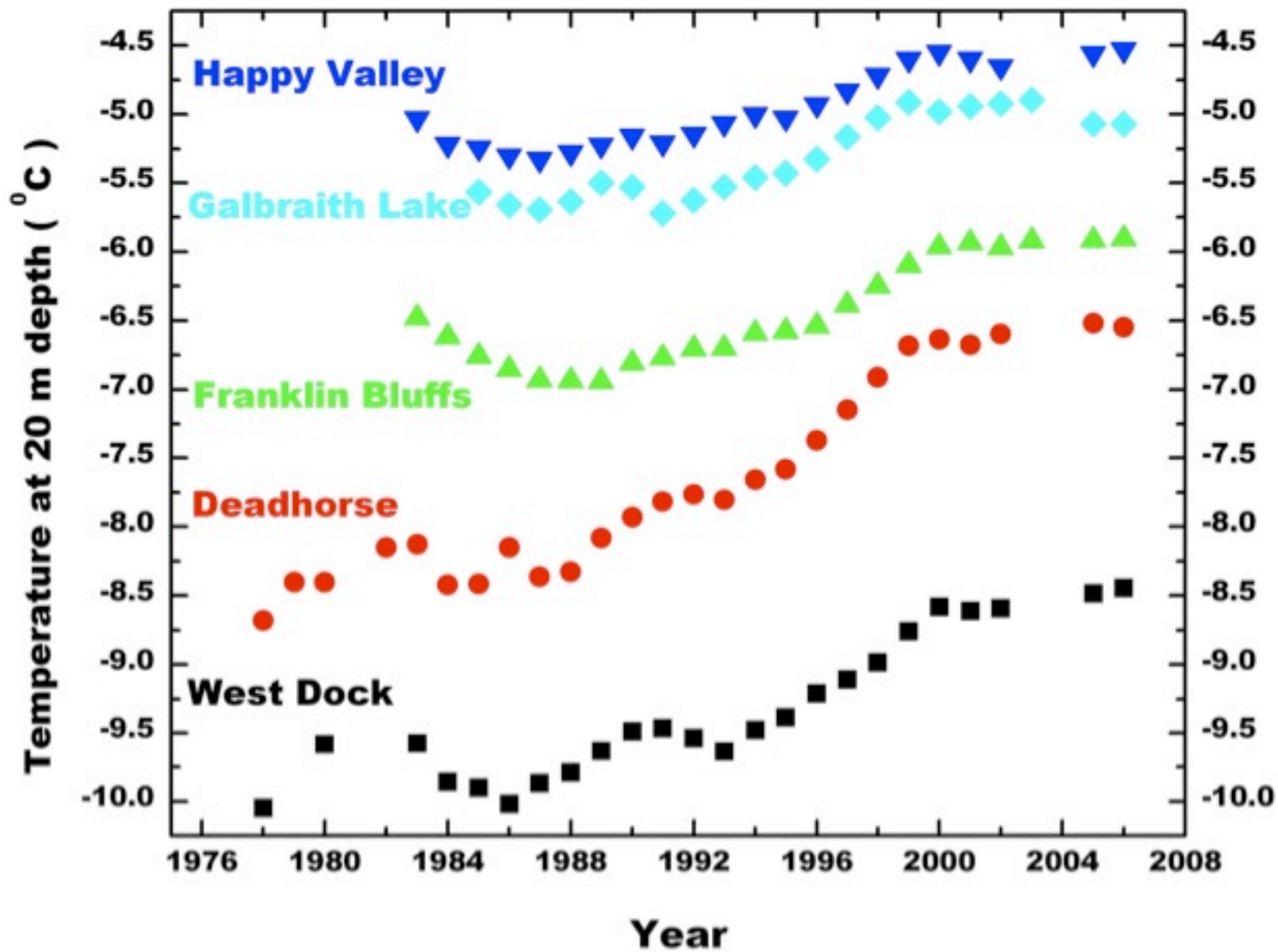


# TEMPERATURE (°C)

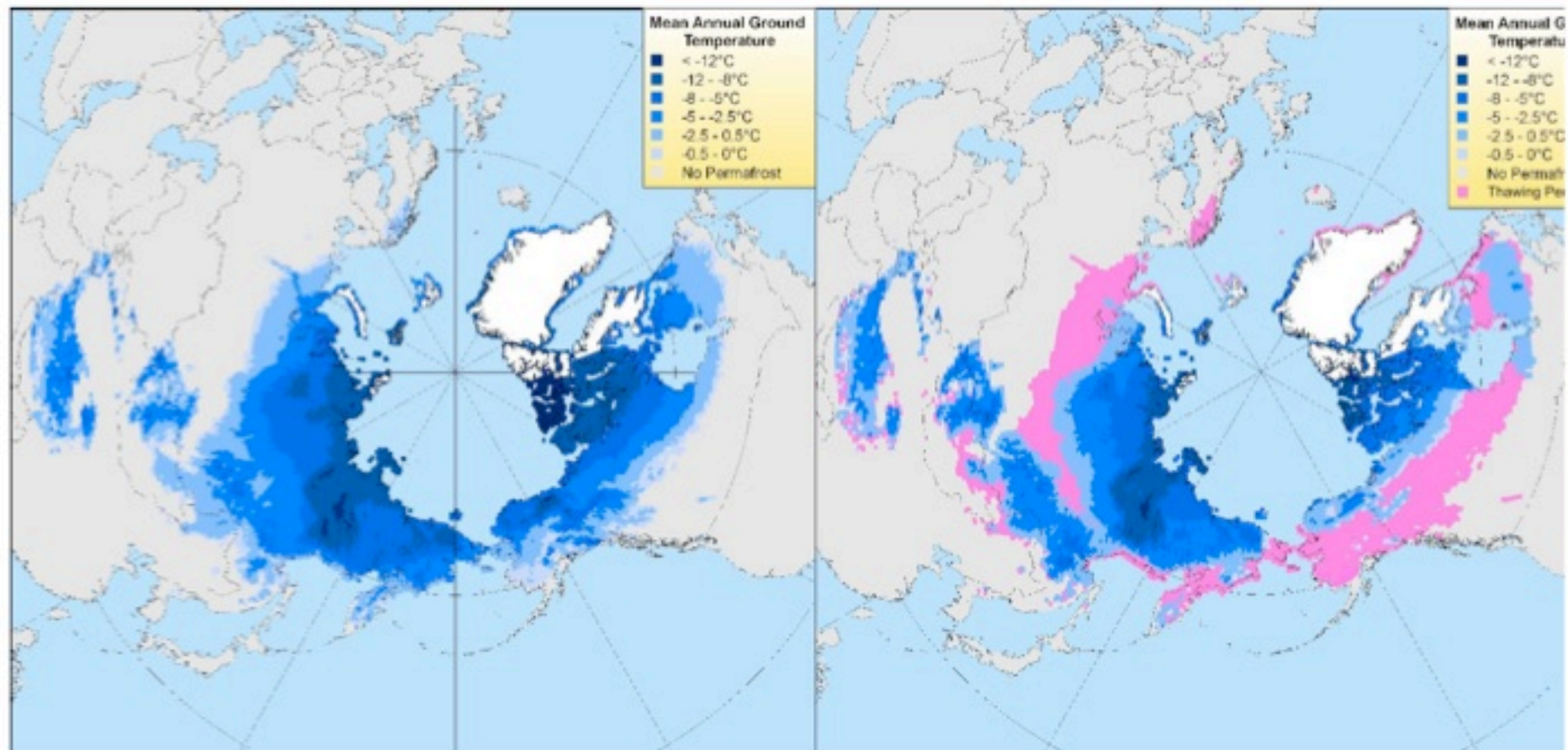




# "TSP" Time Series - Northern Alaska (Osterkamp and Romanovsky)







Modeled circumpolar permafrost temperatures (mean annual temperature at the permafrost surface) averaged over 1980-2000 (A) and 2080-2100 (B) time interval.





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## Elizabeth Eubanks

### **PolarTREC Teacher**

St. Marks Catholic School  
Boynton Beach, Florida

Member of the "Barrow Tundra  
Dynamics '08" PolarTREC Expedition

## Steve Oberbauer

### **Professor**

Department of Biological Sciences  
Florida International University

Miami, Florida

PI on the "Barrow Tundra Dynamics  
'08" PolarTREC Expedition





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Calling in from:  
**Barrow, Alaska**





# LIVE FROM IPY! with Elizabeth Eubanks And the Polar Science FIU Team

Live From the Arctic Tundra Dynamics Expedition  
Barrow, Alaska in the Arctic Circle



**POLAR  
TREC**







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[www.ipy.org](http://www.ipy.org)

## What is PolarTREC?

PolarTREC is a professional development experience in which K-12 teachers are paired with researchers in authentic polar research experiences.

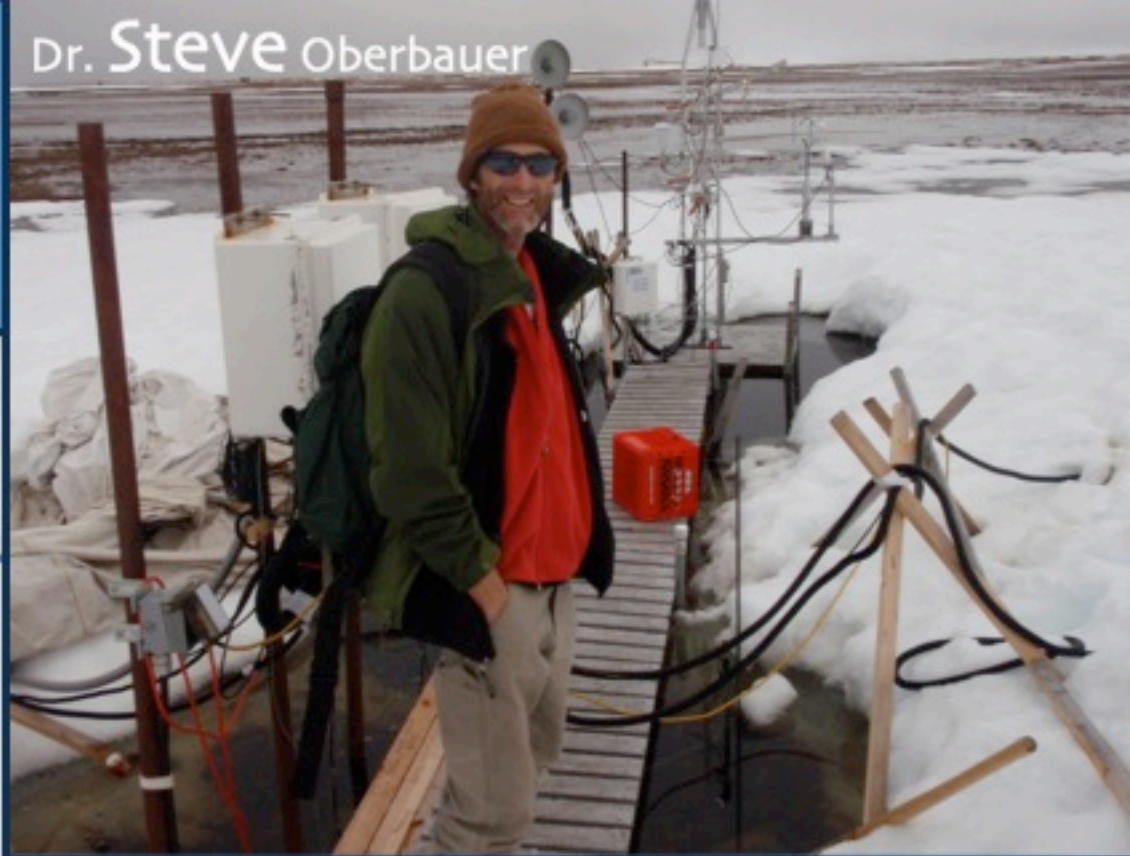
In the next three years 36 teachers from around the United States will join scientists in the Arctic and Antarctic in celebration of the International Polar Year!

**[www.polar-trec.com](http://www.polar-trec.com)**



# Meet the Team

Dr. Steve Oberbauer



Paulo Olivas



Jose Luciani





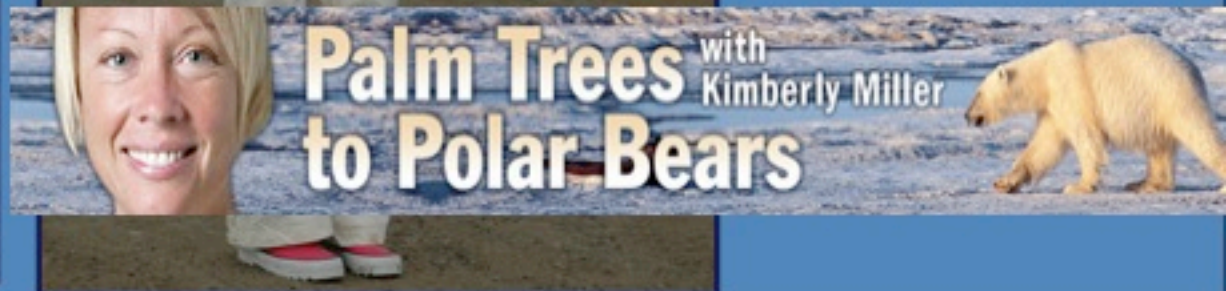
# Also with us today...

**Sandy Apang**  
Teacher From Miami



**Kimberly Miller**

Reporter from  
West Palm Beach





# PolarTREC Teacher Elizabeth Eubanks

St. Mark Catholic School  
Boynton Beach, FL



*Life in the Arctic Circle*  
Barrow, Alaska







I have met some great people and went to the beach with things St. Mark Kids gave me





# On the Arctic Ocean with First Grade and Santa!





Lemming



Arctic Tern



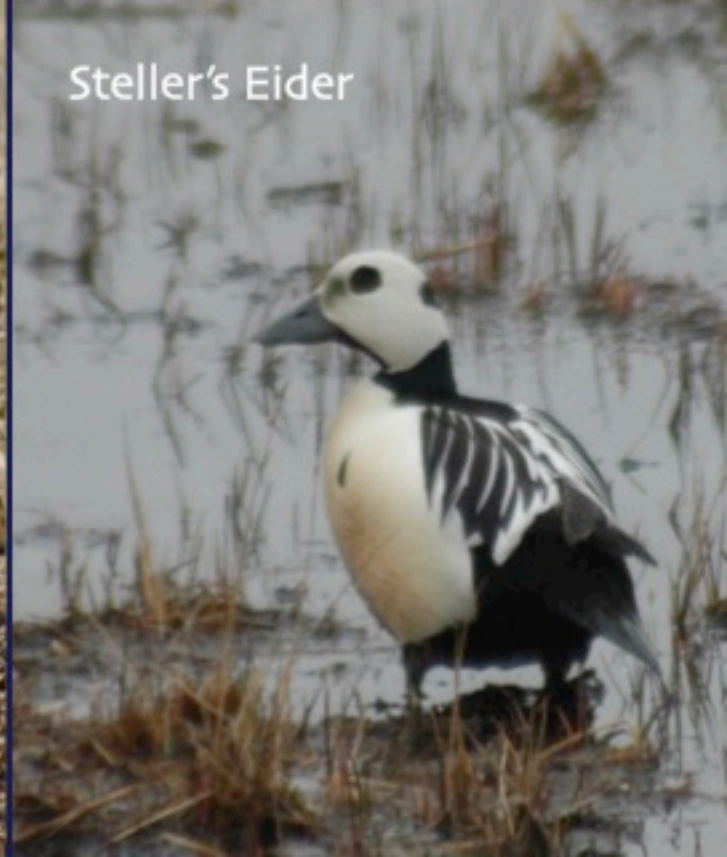
Pectoral Sandpiper



Golden Plover



Steller's Eider







I have been learning...





Dr. Steve Oberbauer, PI

Florida International University







**Barrow Global Climate Change**




*Special Acknowledgments*

U.S. Senator Ted Stevens  
 U.S. Senator Lisa Murkowski  
 U.S. Congressman Don Young


*Supporting Institutions*

National Science Foundation  
 Barrow Arctic Science Consortium  
 Department of Energy-Sandia National Lab  
 International Arctic Research Center  
 University of Alaska  
 San Diego State University  
 University of Cincinnati - Ohio  
 College of William and Mary  
 University of Colorado-Boulder  
 University of Washington  
 Monterey Bay Aquarium Research Institute

**Barrow Global Climate Change Research Facility**

*A modern, Arctic Research Facility intended to support and enhance the continuance of vital research through the integration of traditional knowledge and contemporary science.*



A Cooperative Effort between UIC, NOAA and the Department of Commerce

# Barrow Global Climate Change Research Facility

## The Barrow Environmental Observatory

### Environmental Observatory

Back to the Future

Rupiar Corporation  
 CO  
 Alaska Scientific



#### Universities and Other Organizations

- International Arctic Research Center
- Florida International University
- Marine Biological Laboratory
- Michigan State University
- Nuna Technologies
- Owl Research Institute
- San Diego State University
- University of Alaska
- University of Cincinnati
- University of Delaware
- University of Texas at El Paso
- University of Washington
- University of Wisconsin
- Alfred Wegener Institute
- Max Planck Institute
- China Earthquake Administration
- Forum of Arctic Research Operators

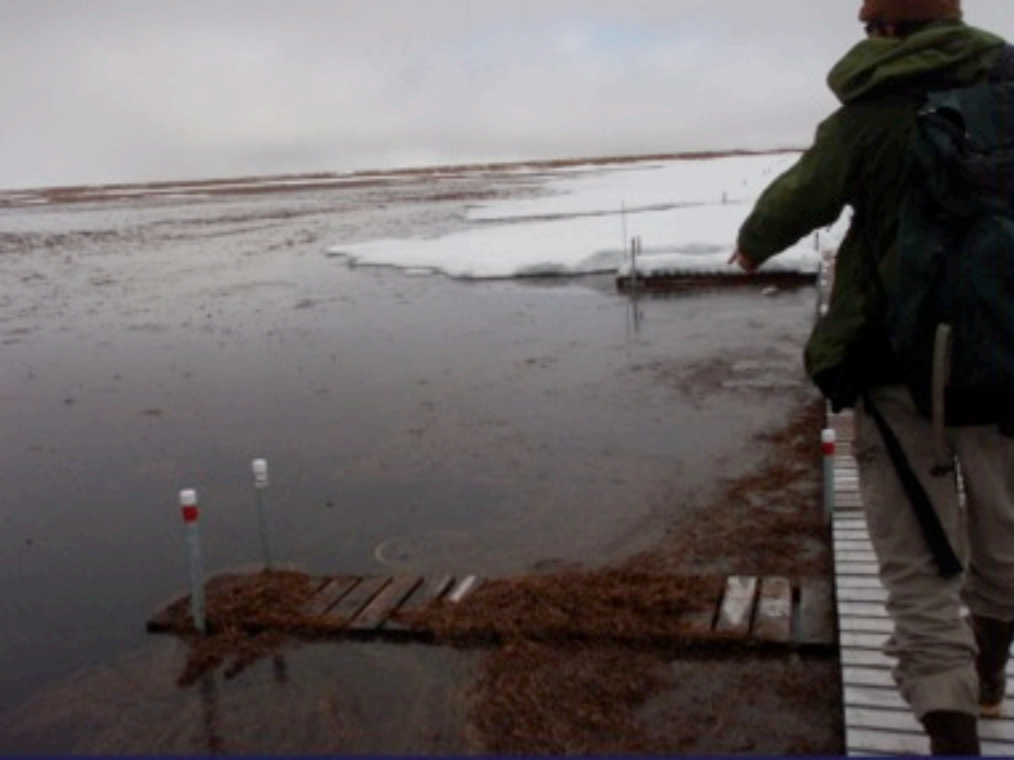
#### Schoolyard Projects





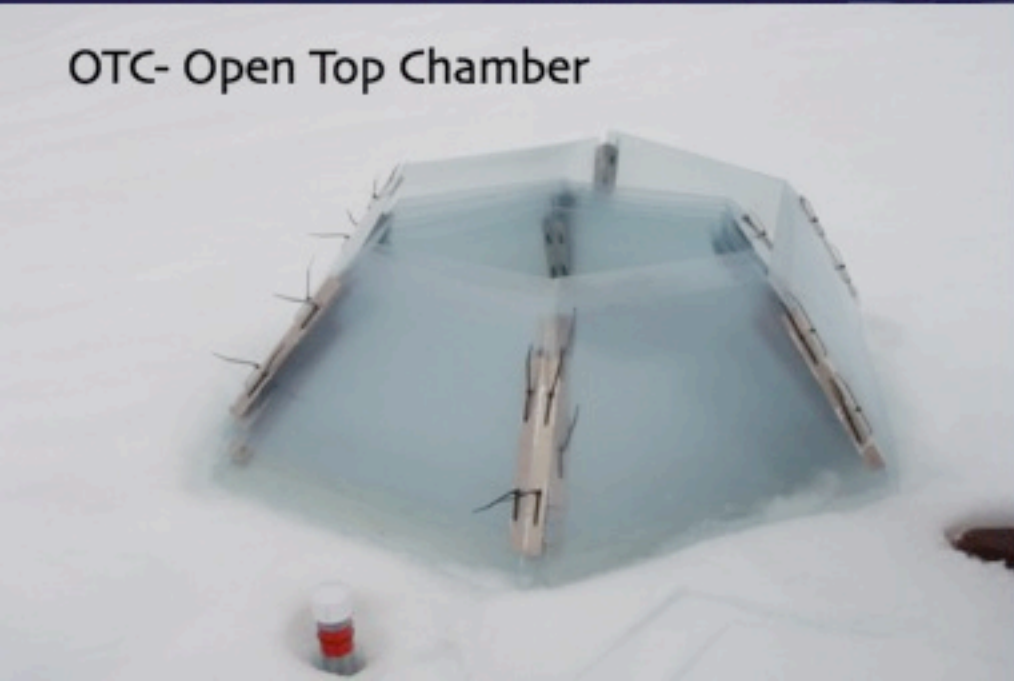






Chamber base

OTC- Open Top Chamber





# Paulo Olivas

Ph.D. candidate  
Florida International University





# Jose Luciani

Undergrad – Env. Studies and Chem.  
Florida International University





# Questions?



Thank you!

For more info log onto [www.polartrec.com](http://www.polartrec.com)





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[www.ipy.org](http://www.ipy.org)



## Cameron Wobus

### **Research Scientist**

Cooperative Institute for Research in  
Environmental Science (CIRES) –  
University of Colorado

Institute for Arctic and Alpine  
Research (INSTAAR)

Boulder, Colorado





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Calling in from:

The Beaufort Sea  
Coast-  
about halfway  
between Barrow  
and Prudhoe Bay





# A Melting Landscape? Toward a predictive model of Arctic coastal erosion in a warming climate



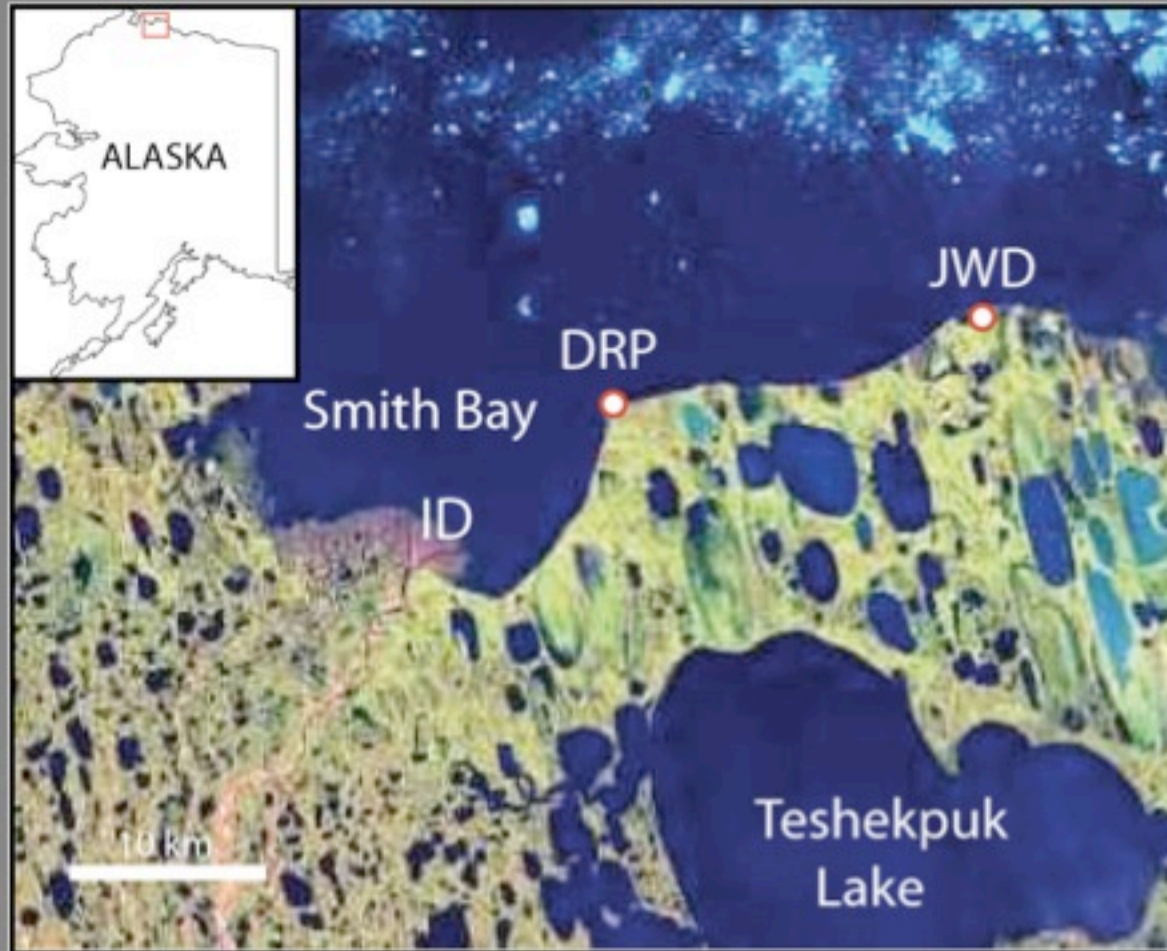
Cameron Wobus – CIRES, University of Colorado

Robert Anderson, Irina Overeem – INSTAAR, University of Colorado

Nora Matell, Cori Holmes – Dept. of Geological Sciences, University of Colorado



# Study Site

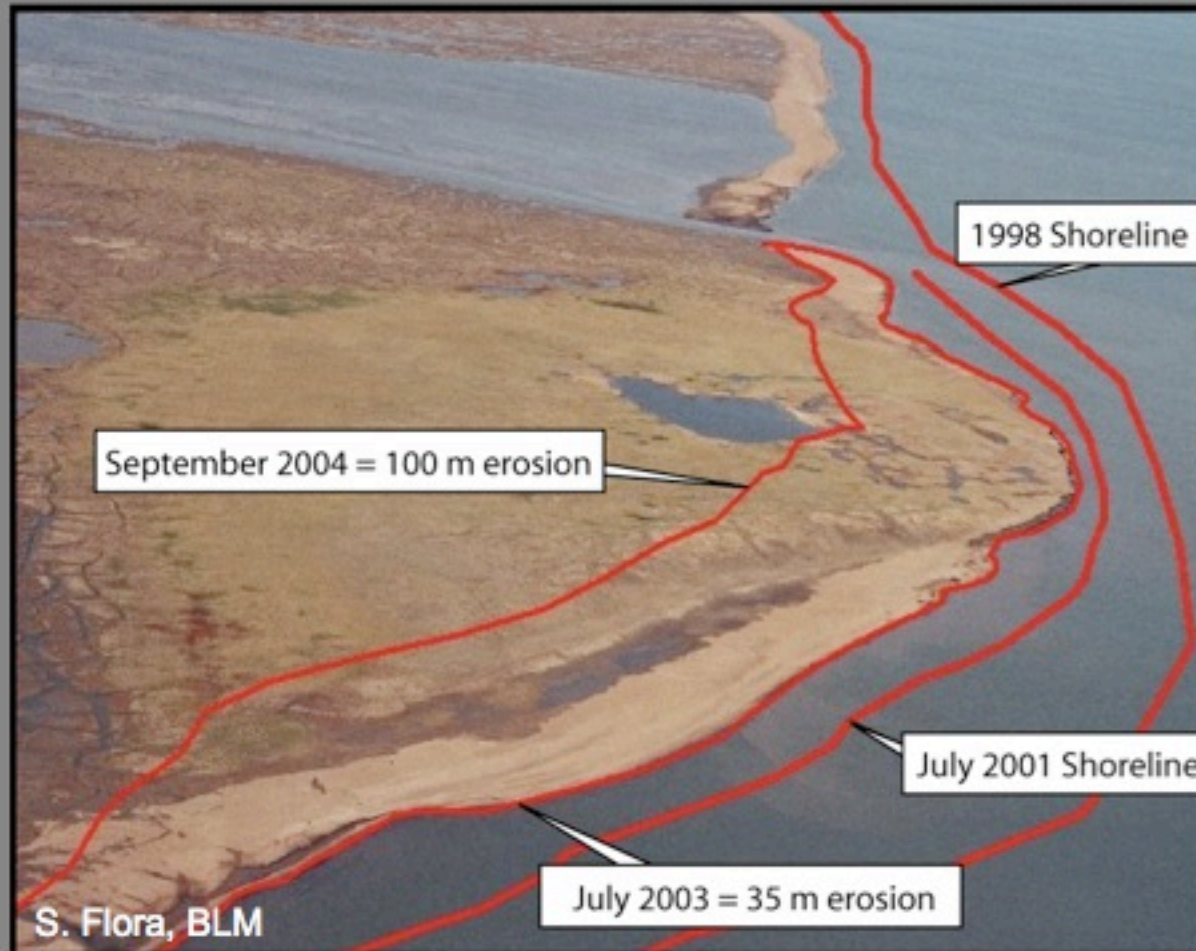


DRP = Drew Point (our camp!)



# Motivation

Erosion rates exceed 10 meters/year along much of the Beaufort Sea coastline





# What are the consequences?

## 1. Loss of freshwater lake habitat





What are the consequences?

2. Loss of historical and archaeological sites





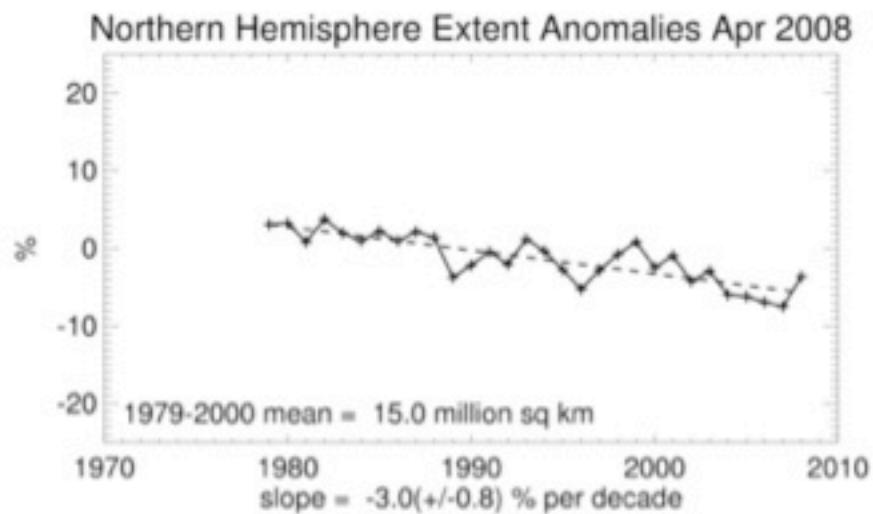
# What are the consequences?

## 3. Loss of infrastructure and environmental contamination



# Is coastal erosion a signal of climate change?

## Arctic Sea Ice is in decline...

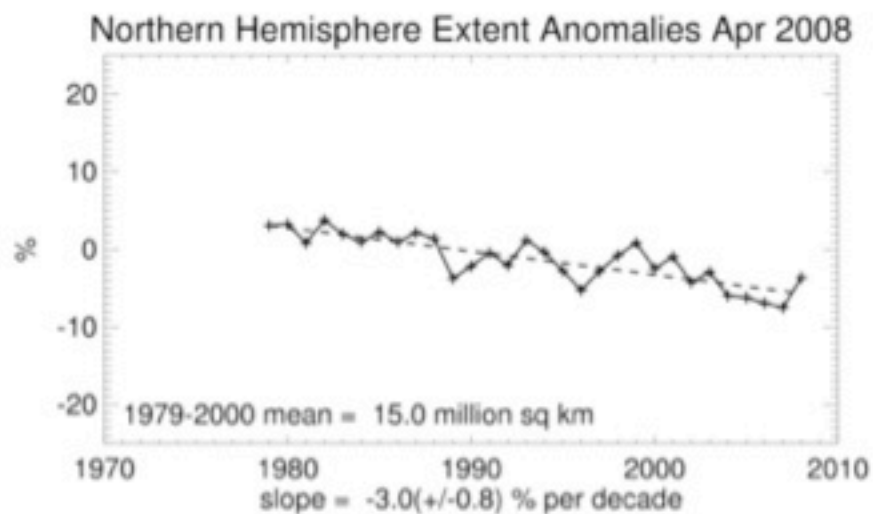


Source: NSIDC, Boulder, CO



# Is coastal erosion a signal of climate change?

## Arctic Sea Ice is in decline...



Source: NSIDC, Boulder, CO

Sea Ice Extent  
Aug 2007



National Snow and Ice Data Center, Boulder, CO

median  
ice edge

Total extent = 5.3 million sq km

# Hypothesis

Declining sea ice speeds coastal erosion by two mechanisms:

1. More open water → More wave attack along Arctic coasts



NSIDC.org



AAAS.org



# Hypothesis

Declining sea ice speeds coastal erosion by two mechanisms:

2. Warming coastal waters → faster melting of ice-rich bluffs



5 Days of erosion: NO STORMS (But 15°C water)

# Hypothesis

Declining sea ice speeds coastal erosion by two mechanisms:

2. Warming coastal waters → faster melting of ice-rich bluffs

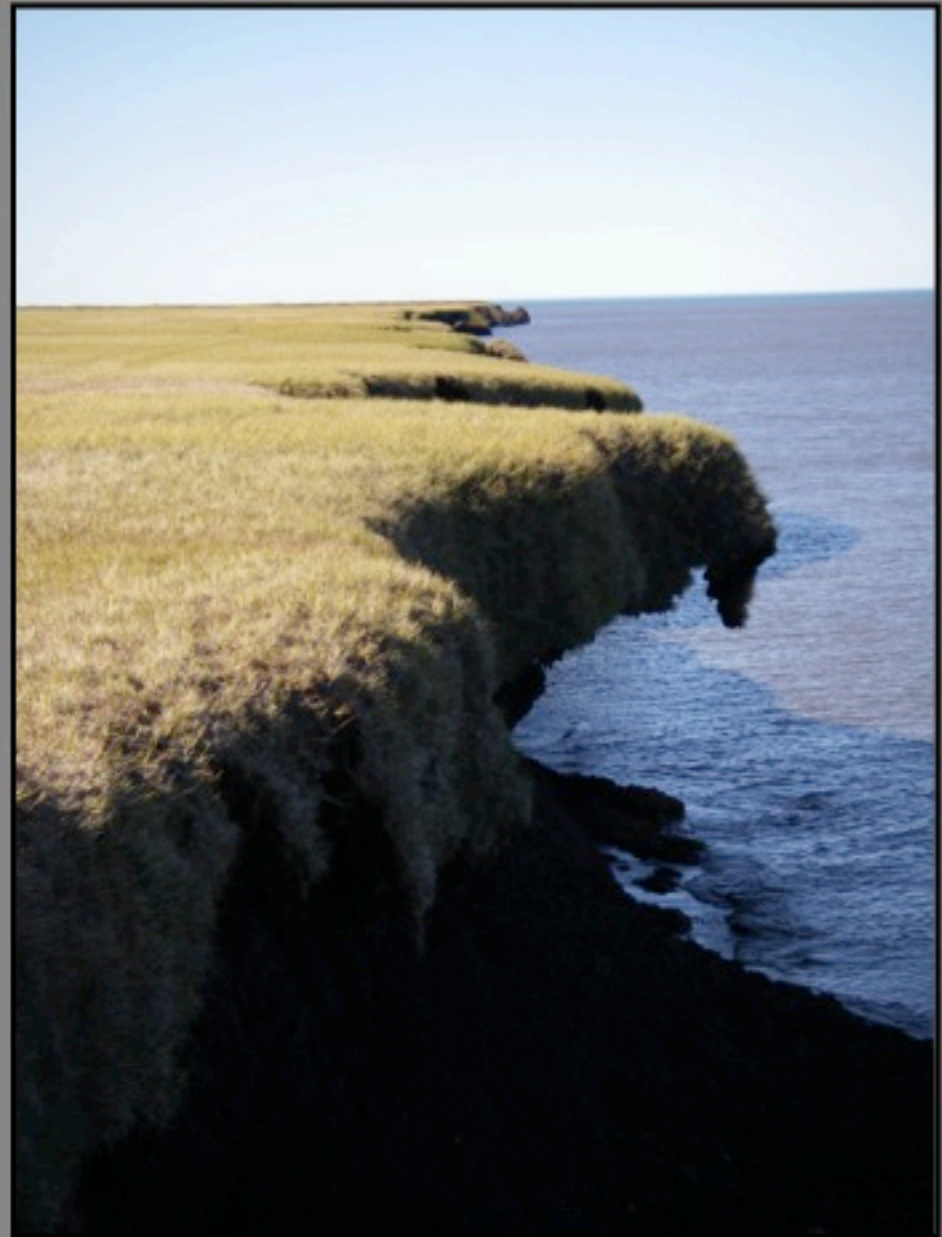


5 Days of erosion: NO STORMS (But 15°C water)



## Summary - Study Objectives

1. Is coastal erosion accelerating?
  - Satellite and airphoto imagery
  - GPS surveys
2. What are the major drivers?
  - Weather and climate data
  - Sea surface temperatures
  - Wave energy
  - Bluff material properties
  - Time-lapse photography
3. Can we predict future change?
  - Numerical modeling





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## Jenny Baeseman

### Researcher

McMurdo Dry Valleys LTER Investigator

International Arctic Research Center  
(IARC)

Association of Polar Early Career Scientists  
(APECS)

Arctic Research Consortium of the United  
States (ARCUS)





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[www.ipy.org](http://www.ipy.org)



Calling in from:

Fairbanks, Alaska



# Antarctica

## Life in a Cold Desert

*Dr. Jenny Baeseman*

*McMurdo Dry Valleys Investigator*





# The McMurdo Dry Valleys: An Oasis for Life?









# “Valleys of the Dead”

- Robert F. Scott, 1903

- ❖ **Glaciers**
- ❖ **Streams**
- ❖ **Lakes**
- ❖ **Lots of Sand and Rocks**
- ❖ **Petrified Seals and Penguins**



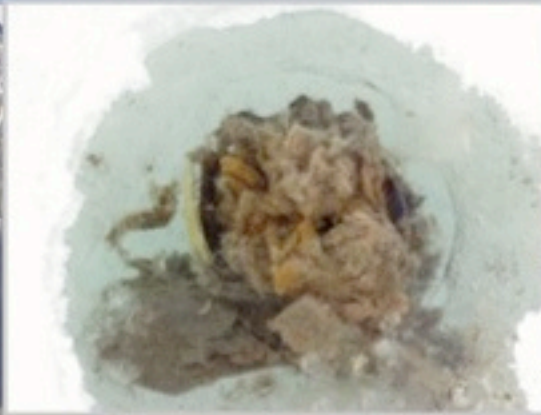


# Where there is Water,

# There is LIFE !!!

*It's just little...*

- Collombola
- Nematodes
- Lichens
- Moss
- Microorganisms






# Charlie




- ✦ **Adelie Penguin**
- ✦ **1 ½ years old**
- ✦ **15 miles from food**



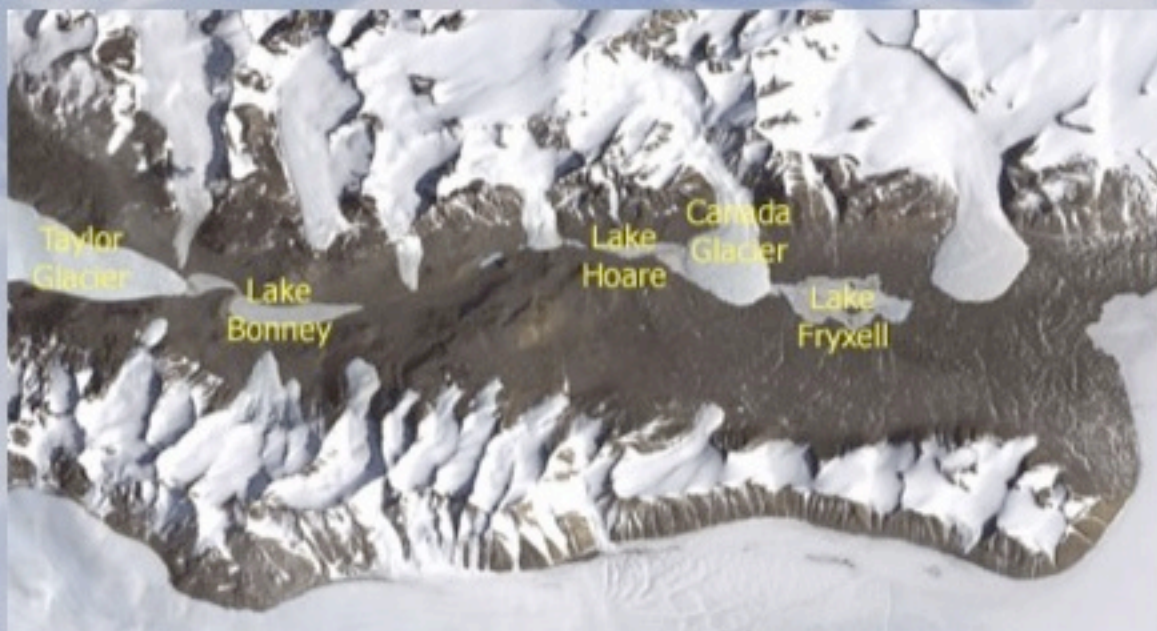
# McMurdo Dry Valleys LTER and Microbial Observatory

 The McMurdo Dry Valleys Long-Term Ecological Research (MCM LTER) Program is an interdisciplinary and multidisciplinary study of the aquatic and terrestrial ecosystems in an ice-free region of Antarctica.

<http://www.mcmter.org/>

 A primary reason for establishing a MO for the dry valley lakes is to understand not just how the environment controls the diversity of organisms, but also how diversity itself controls the functioning of ecosystems.

<http://mcm-dvlakesmo.montana.edu/>





# “Simple” System

Great for basic environmental research

**No plants or animals**  
**Minimal human impacts**  
**Closest biome to Mars**





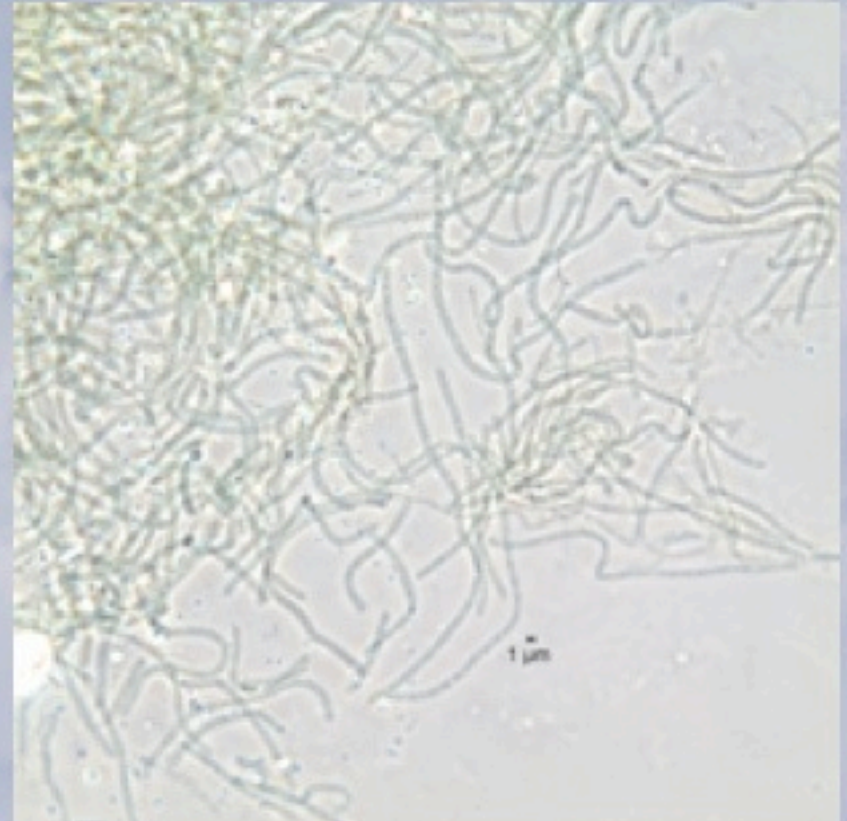
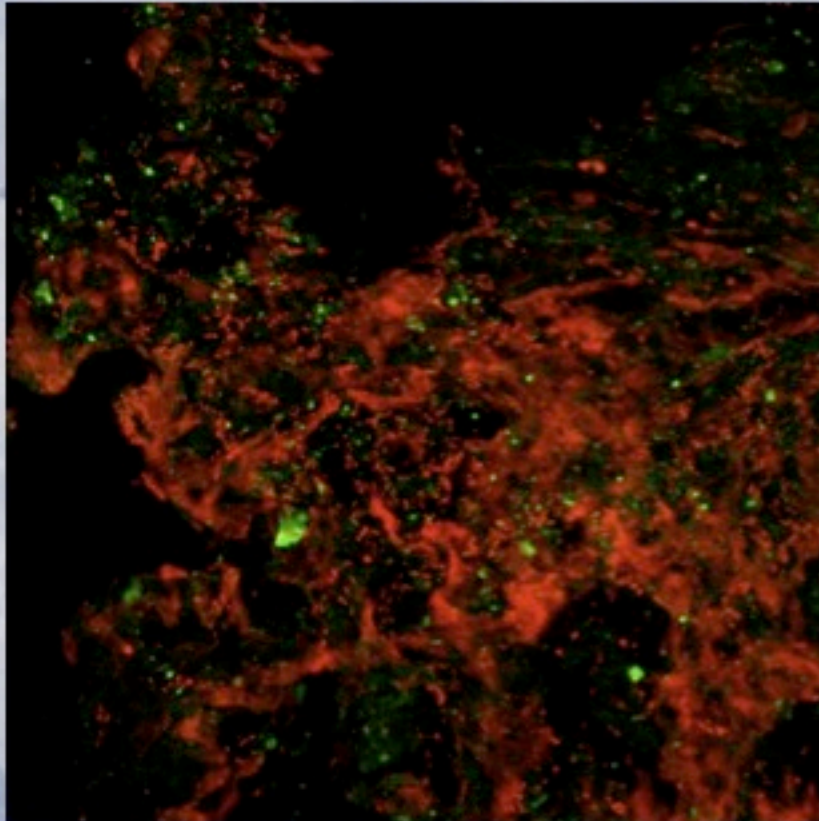








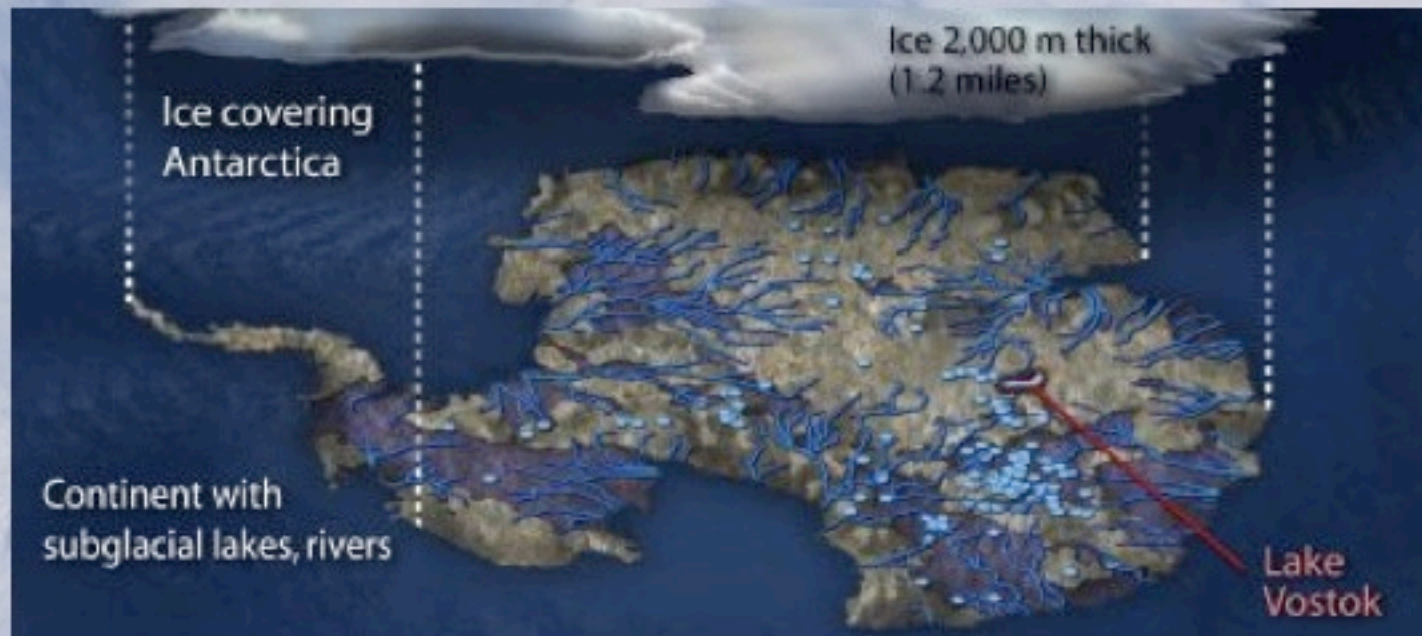
# 8,000 year old Cyanobacteria... **brought back to life!!!**





# Subglacial Antarctic Lake Environments

- SALE - Subglacial Antarctic Lake Environments - is a Scientific Committee on Antarctic Research (SCAR) program that brings together an international confederation of scientists dedicated to understanding the interplay of biological, geological, chemical, glaciological, and physical processes within subglacial environments.











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[www.ipy.org](http://www.ipy.org)

# QUESTIONS?

*Remember to clearly state your name, school or organization,  
and who your question is for.*





Check out and register for upcoming events!



**July 10 2008—Elizabeth Eubanks in Barrow, Alaska**

*Register for this event and watch for others at [www.polartrec.com](http://www.polartrec.com)!*






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18 June 2008**



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24 September 2008**



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**Polar Oceans Day -  
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# Thank You!



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Or Call 907-474-1600

Email: [infr@polartrec.com](mailto:infr@polartrec.com)



ARCUS

