



TEACHERS AND RESEARCHERS
EXPLORING AND COLLABORATING

Welcome to a *live C-ISE Event!*

Applied Earth Science for Educators II

with Dr. Al Werner

Mt. Holyoke College, MA

Monday 30 July 2012

1pm Alaska Daylight Time

(2:00 pm PDT, 3:00 pm MDT, 4:00 pm CDT, 5:00 pm EDT)

Slides will be shown here

Exit the presentation

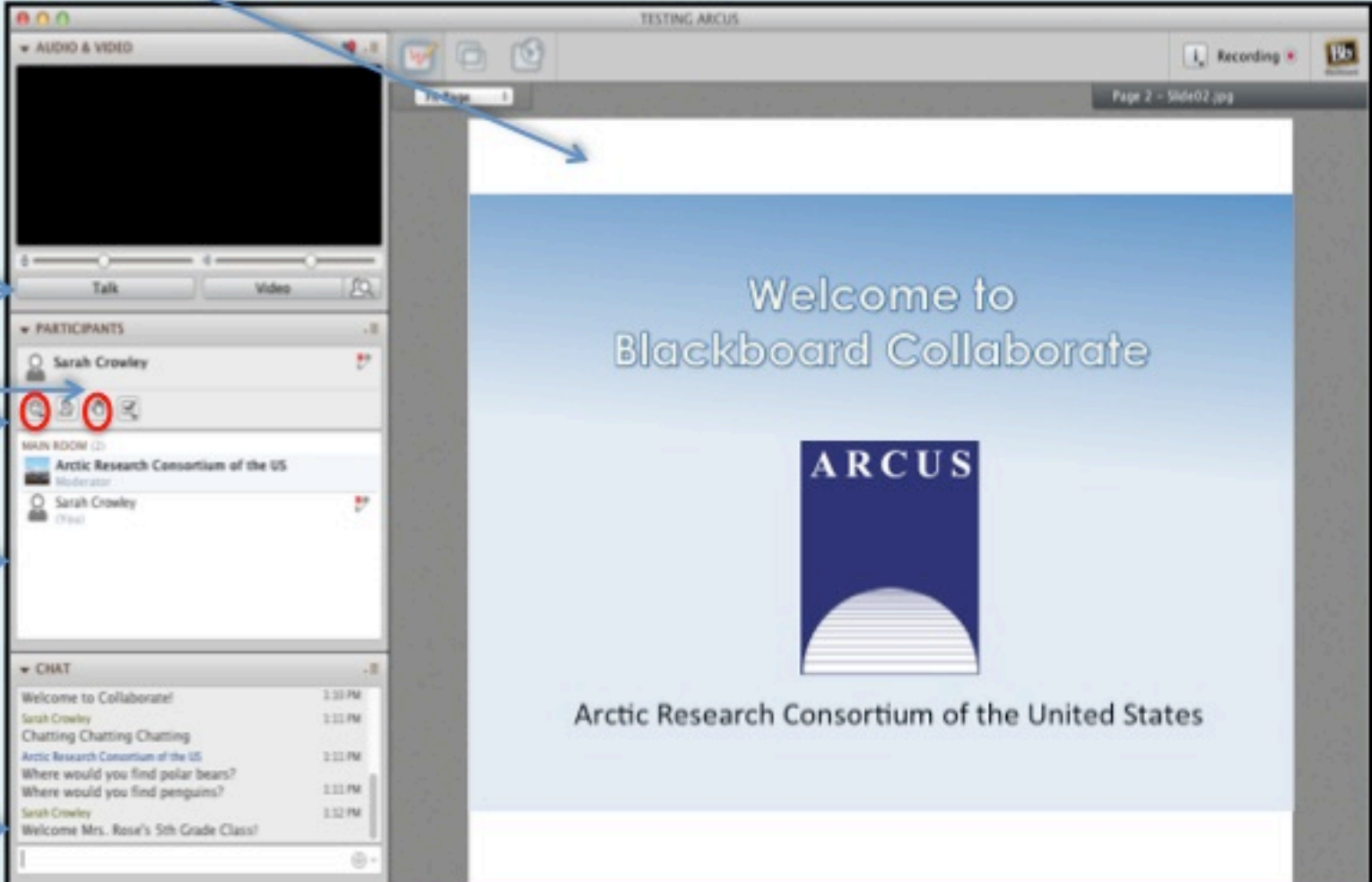
Click to Talk,
Unclick to finish talking

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 "Talk" button and a "Video" button; "PARTICIPANTS" with a list of participants including Sarah Crowley and Arctic Research Consortium of the US; "MAIN ROOM" with a list of participants; and "CHAT" with a chat history showing messages like "Welcome to Collaborate!" and "Where would you find polar bears?". Blue arrows point from the text labels on the left to the corresponding elements in the interface.

Please Note:

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



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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.

Participant Introductions

When called, please state your:

- ✓ Name
- ✓ School / Institution
- ✓ The number of participants with you in the same location



TEACHERS AND RESEARCHERS
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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.

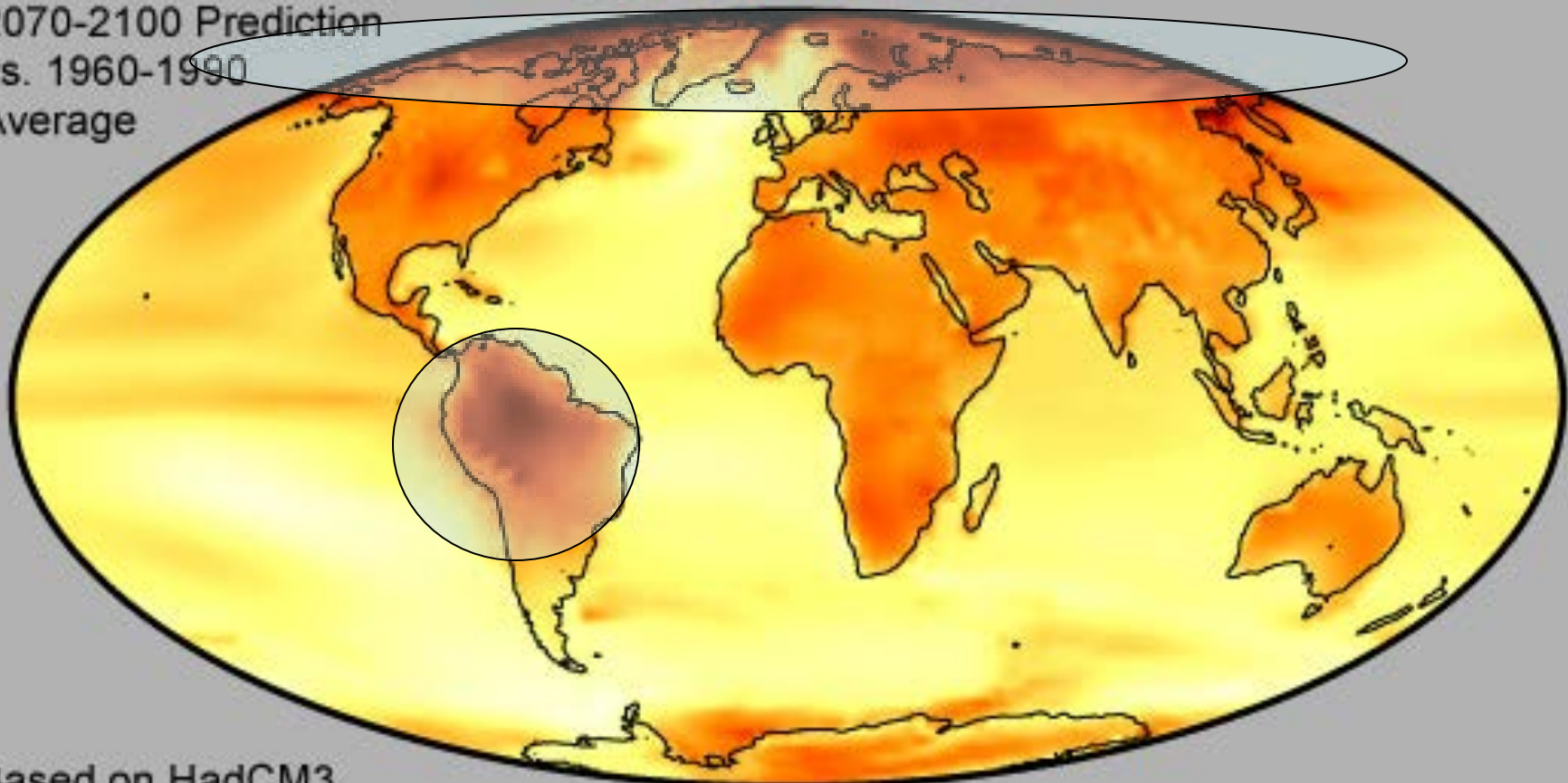
From 2010-2013, nearly 50 teachers from around the United States will join scientists in the Arctic and Antarctica to learn about science, the polar regions, and to share what they have learned with their students and communities.

Climate Change

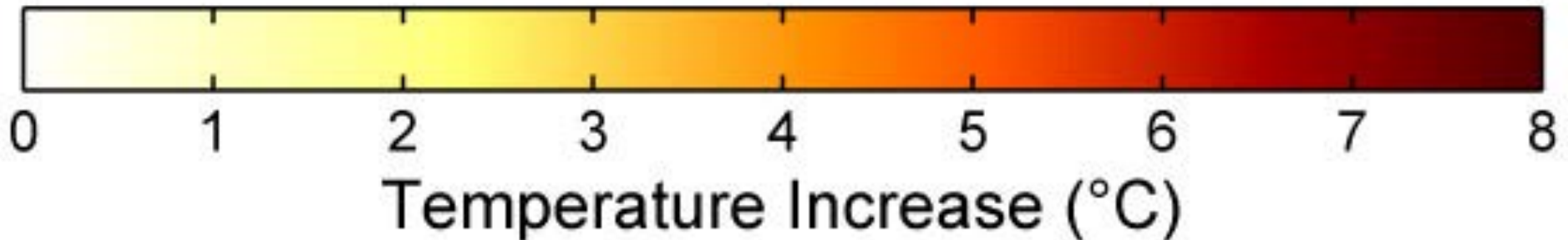


Global Warming Predictions

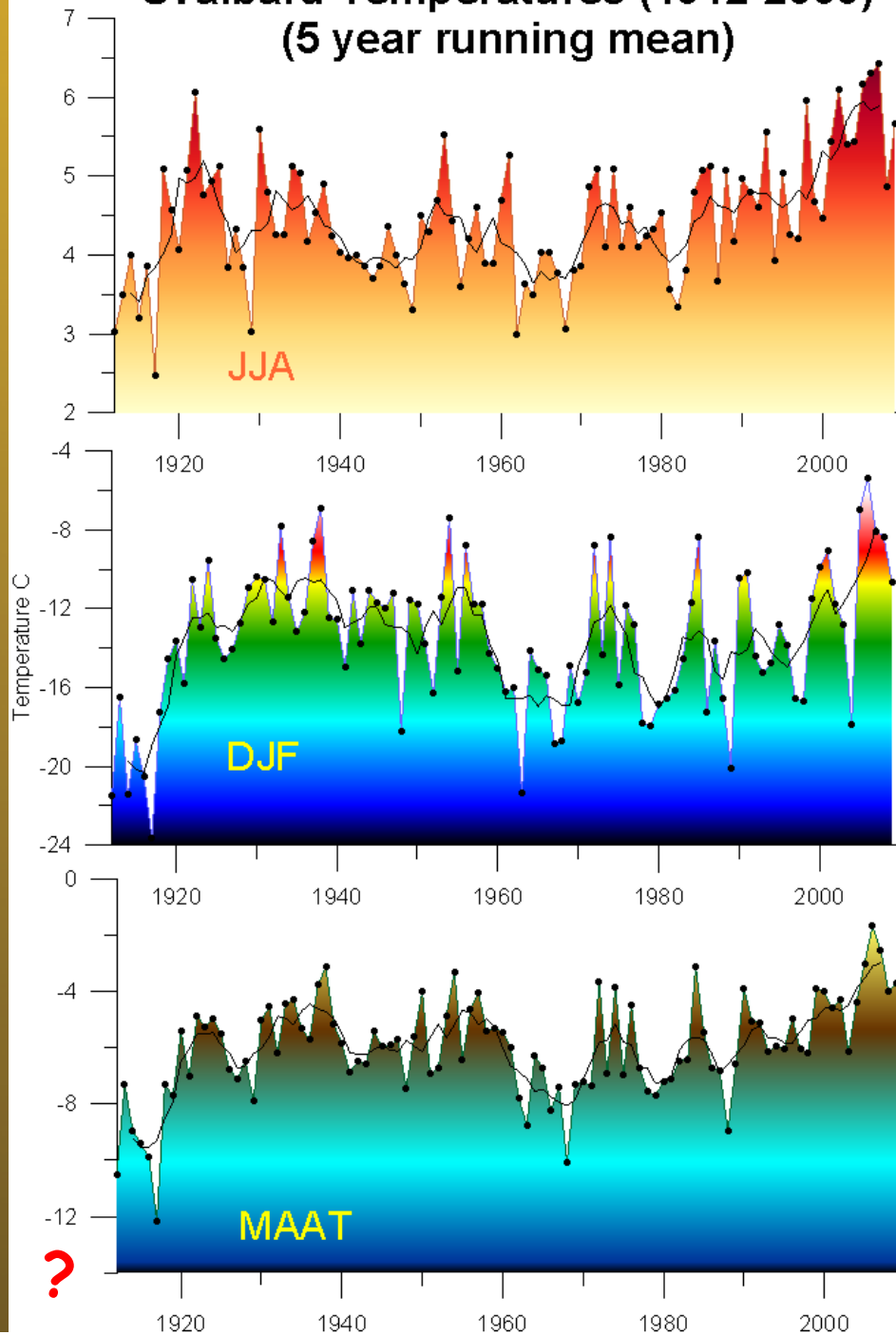
2070-2100 Prediction
vs. 1960-1990
Average



Based on HadCM3



Svalbard Temperatures (1912-2009)
(5 year running mean)



Summer Temps

Winter Temps

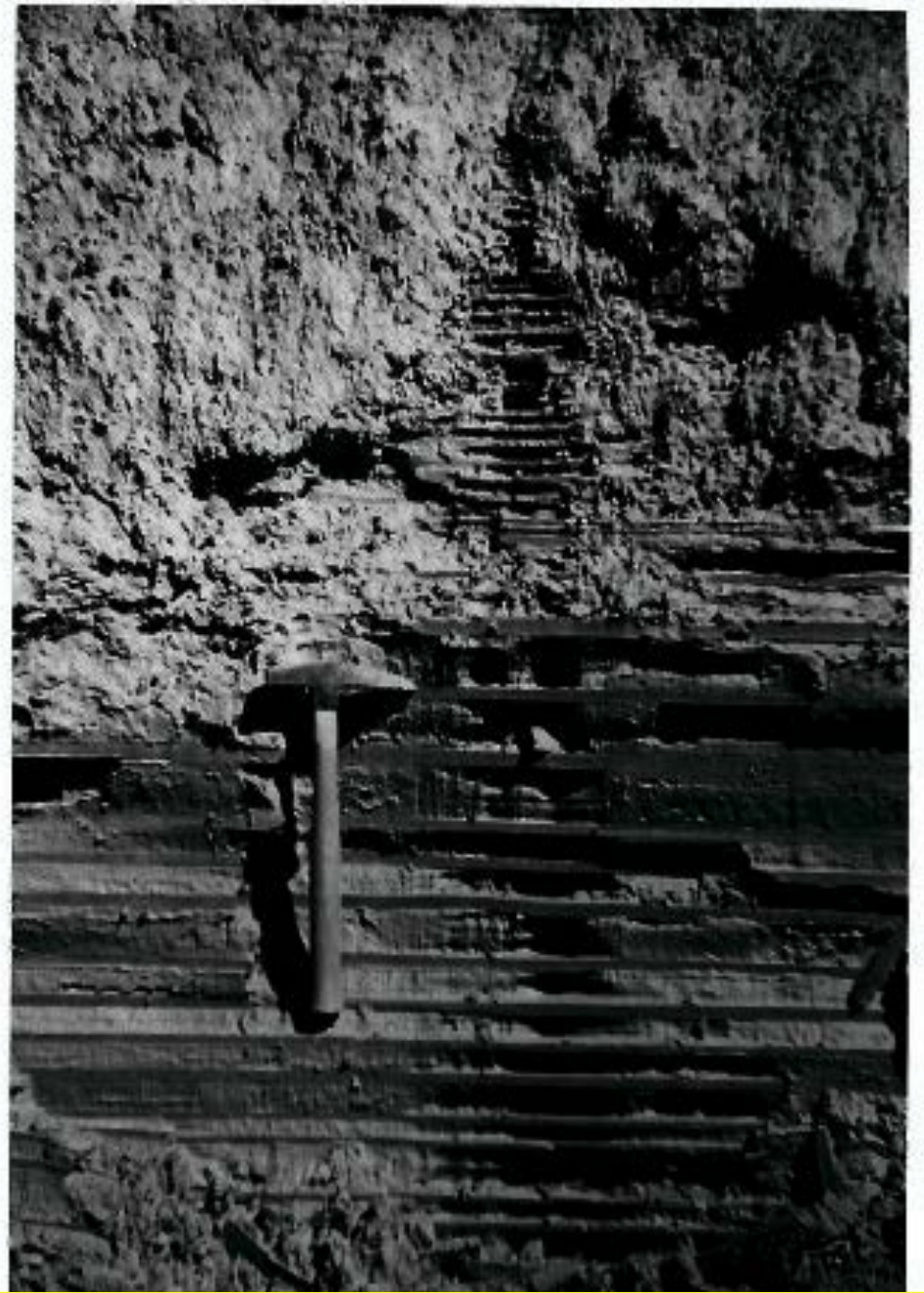
Mean Annual Temps

The background of the slide is a photograph of a cave wall covered in prehistoric paintings. The paintings are in earthy tones, primarily ochre and black. They depict various animals, including horses, deer, and a large dinosaur-like creature. There are also several human figures, some appearing to be in motion or dancing. The overall scene is a dense collection of ancient art.

But what about the
pre-historic record?

Need to look at proxies of climate...

Varves!



From Ashley, 1972 – photo by Joe Hartshorn



S

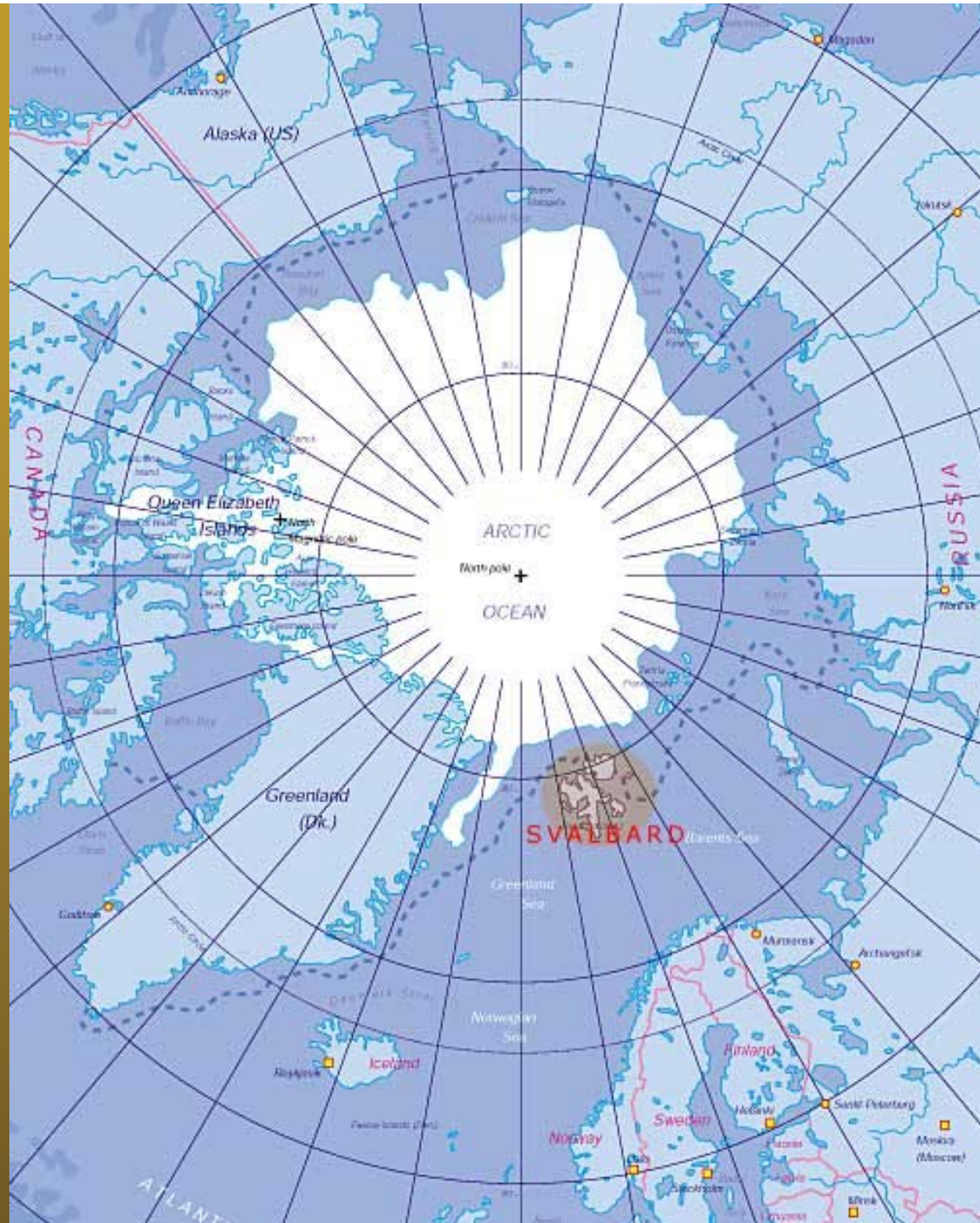
W

Summer:

meltwater
waves
curents

Winter:

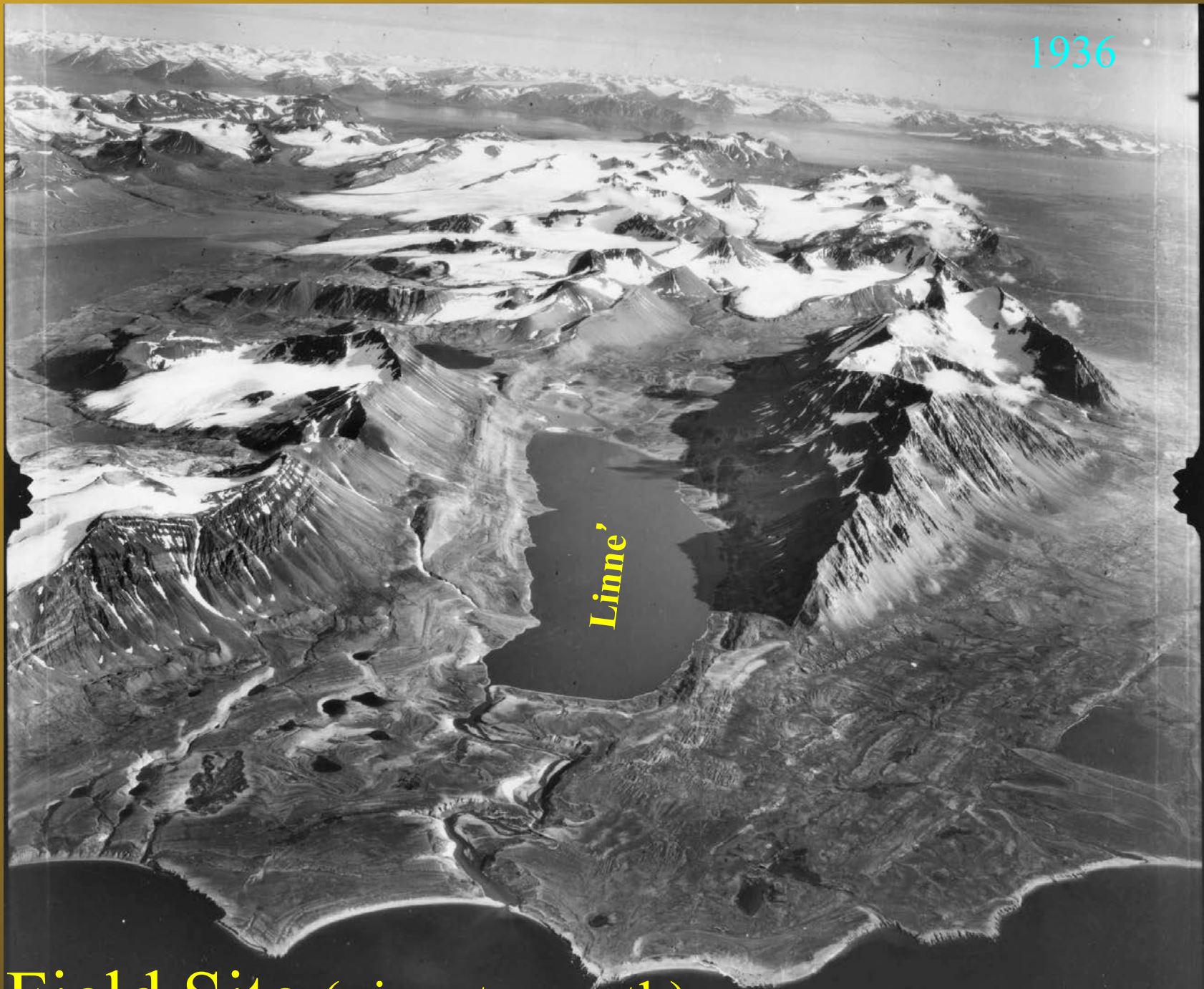
no meltwater
lake ice
quiet water

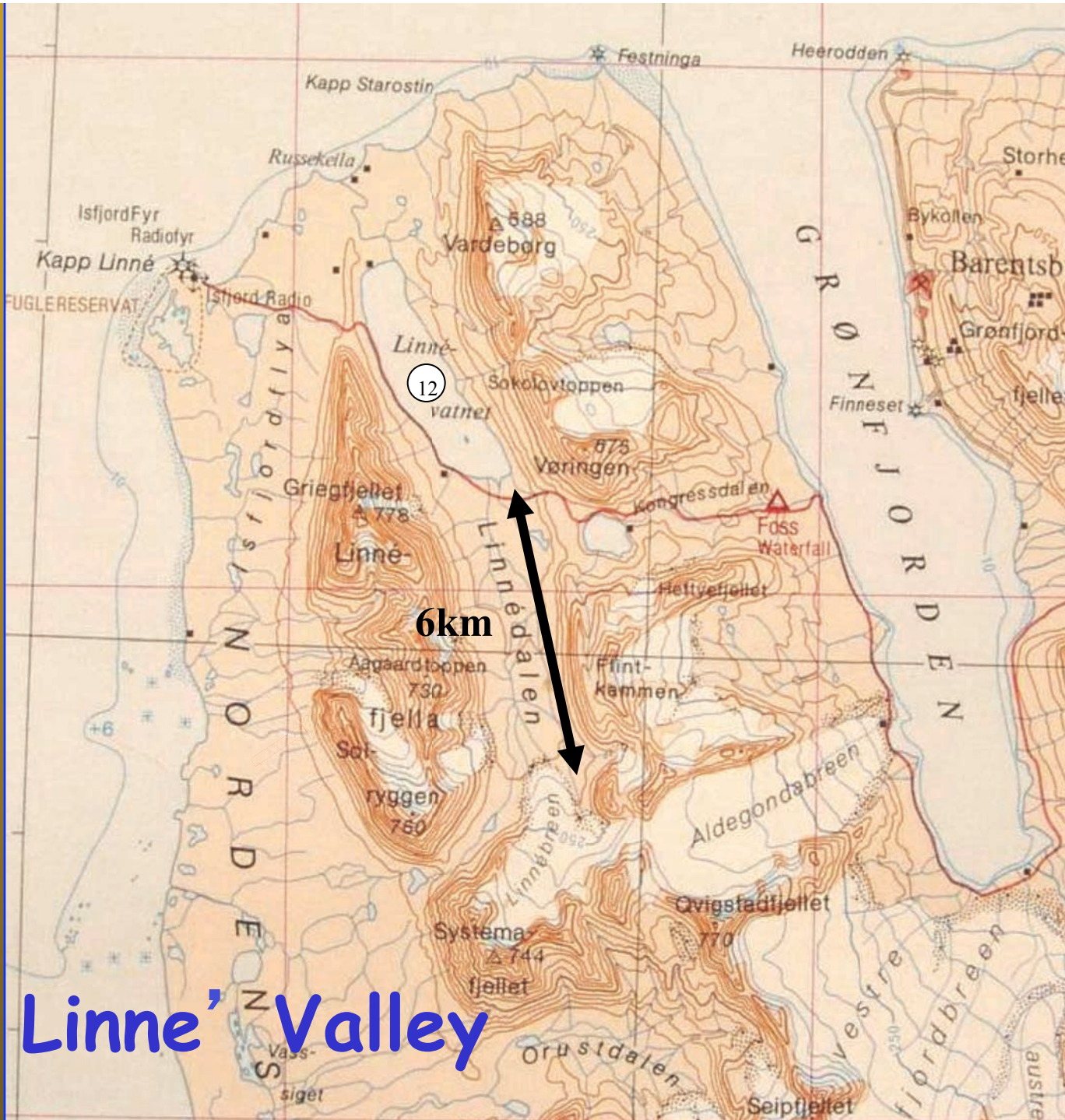


1936

Linne'

Field Site (view to south)





6km

Linné Valley

What controls annual sediment deposition in a glacier-fed lake?

Results from the Svalbard REU project, Spitsbergen, Norway

Al Werner, Department of Geology and Geography, Mount Holyoke College

Steve Roof, School of Natural Science, Hampshire College

Mike Retelle, Bates College

Julie Brigham-Grette, Univ. Massachusetts Amherst

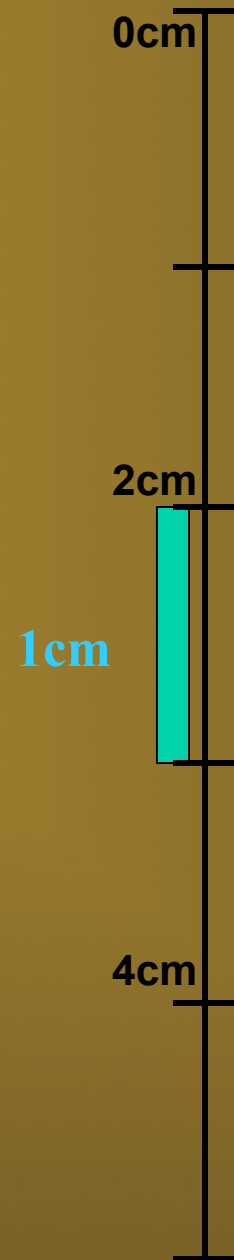
Ross Powell, Northern Illinois University



Laminations!!!!



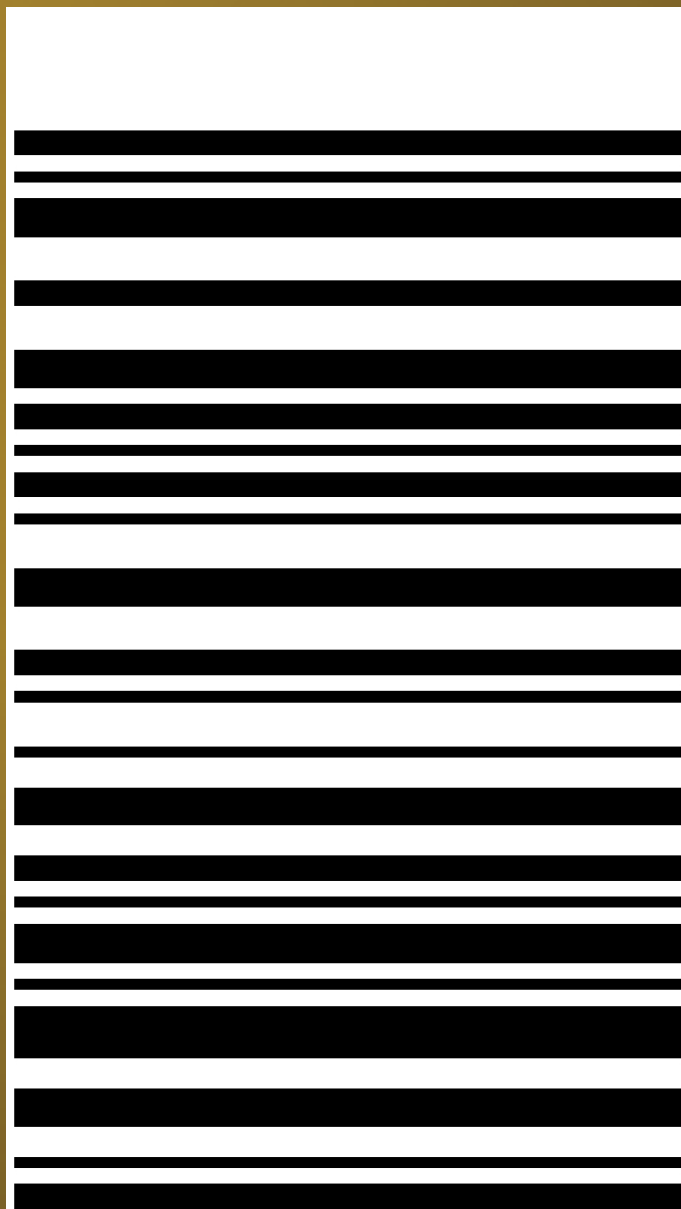
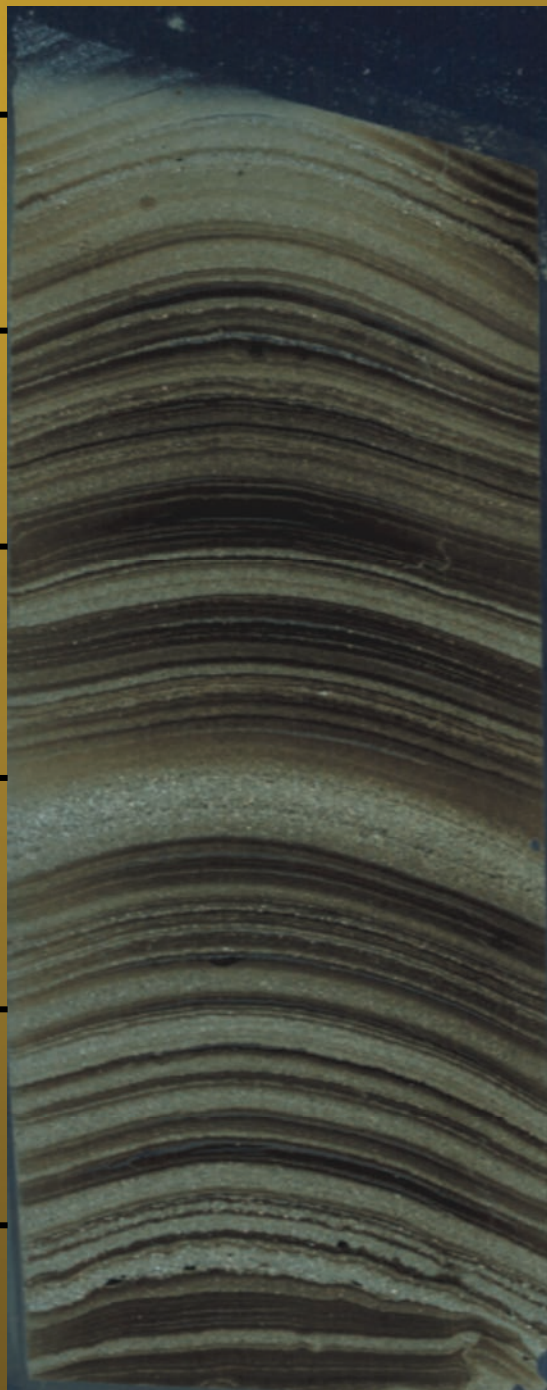
What do
they
mean???



26cm

28cm

30cm



1 2 3 4 5 6

Sedimentation Processes

A wide-angle photograph of a coastal landscape. In the foreground, there is a sandy beach on the left and a calm, greyish-blue ocean. The middle ground shows a wide, flat expanse of land, possibly a tidal flat or a large field, with a small red building in the distance. The background features a range of dark, rugged mountains under a hazy, overcast sky. The overall scene is somewhat desolate and atmospheric.

when, how and why ???

What might be important???

Glacier

Temperature

Stream

Snow

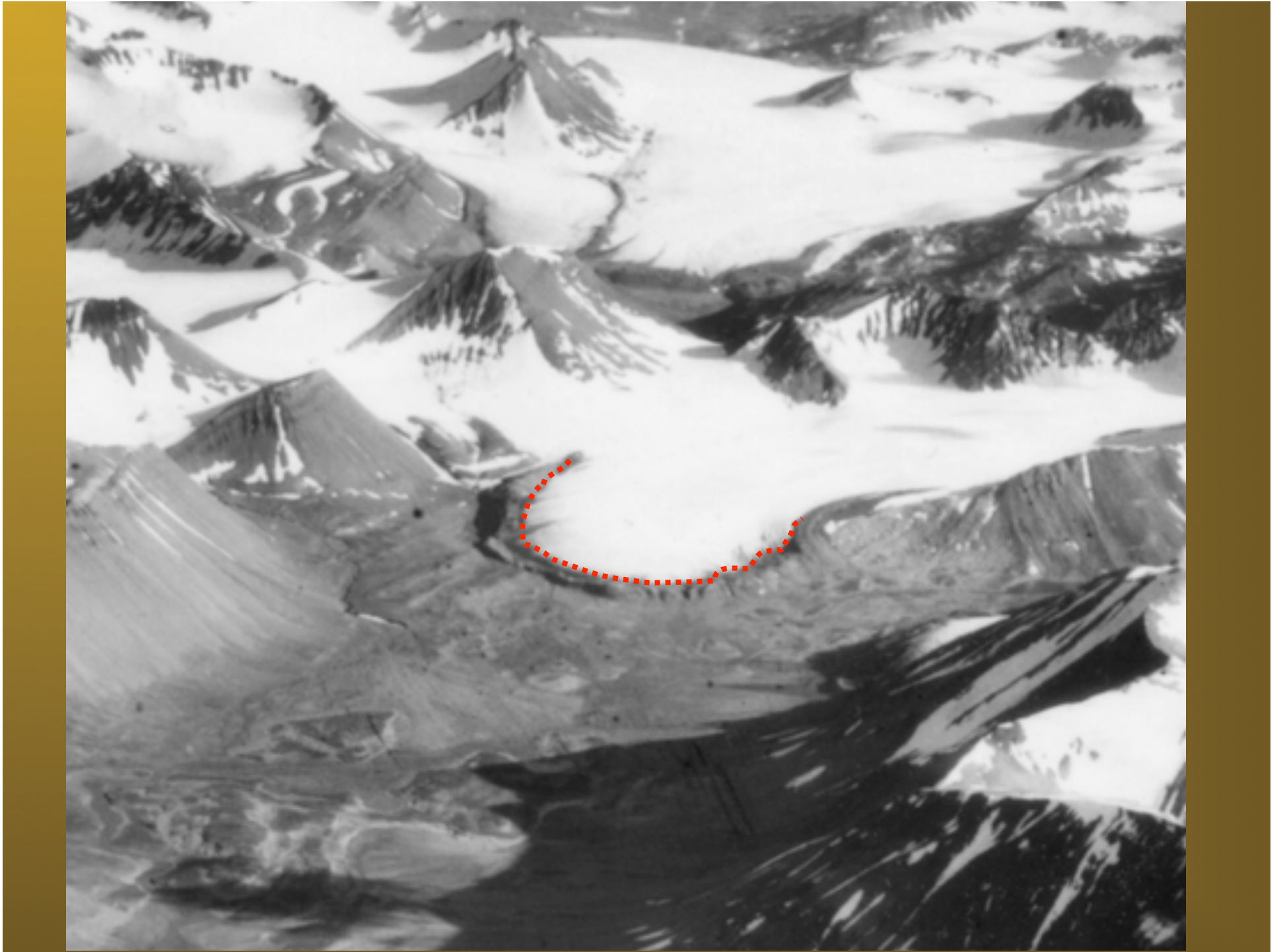
Lake

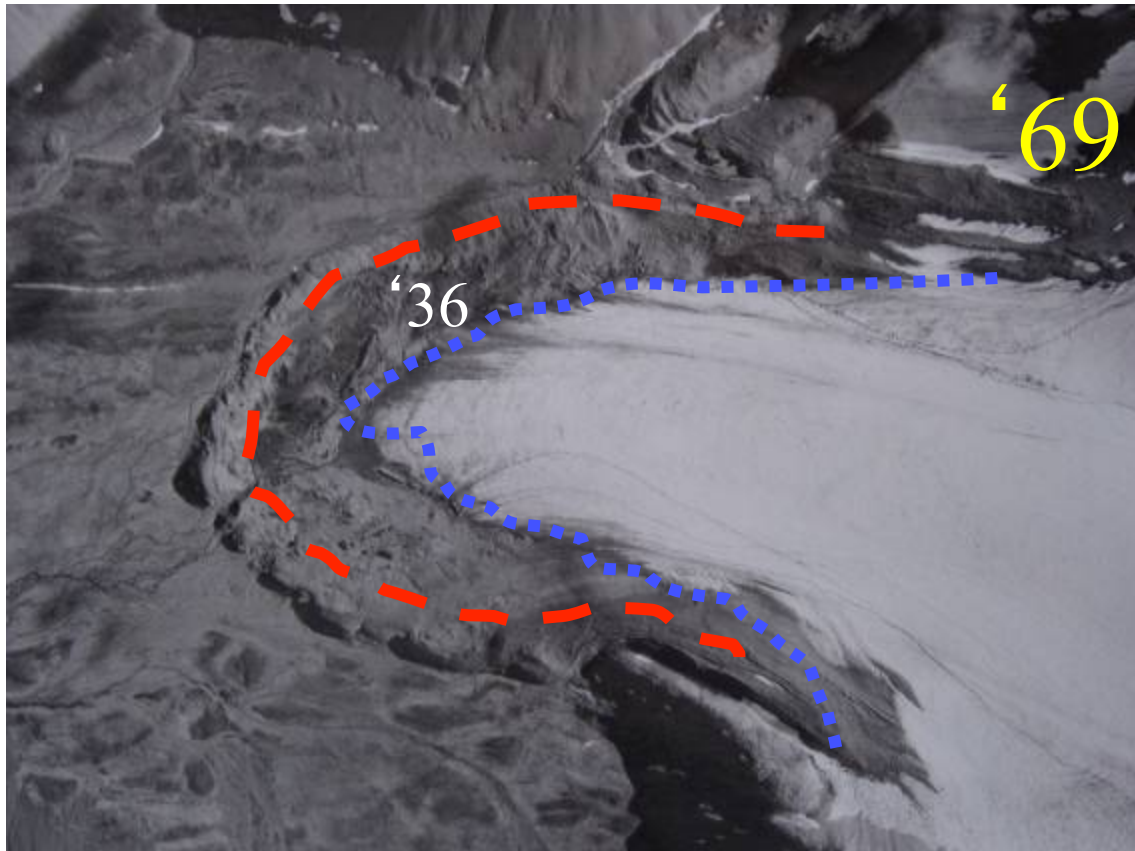
Rain

Glacier: sediment source

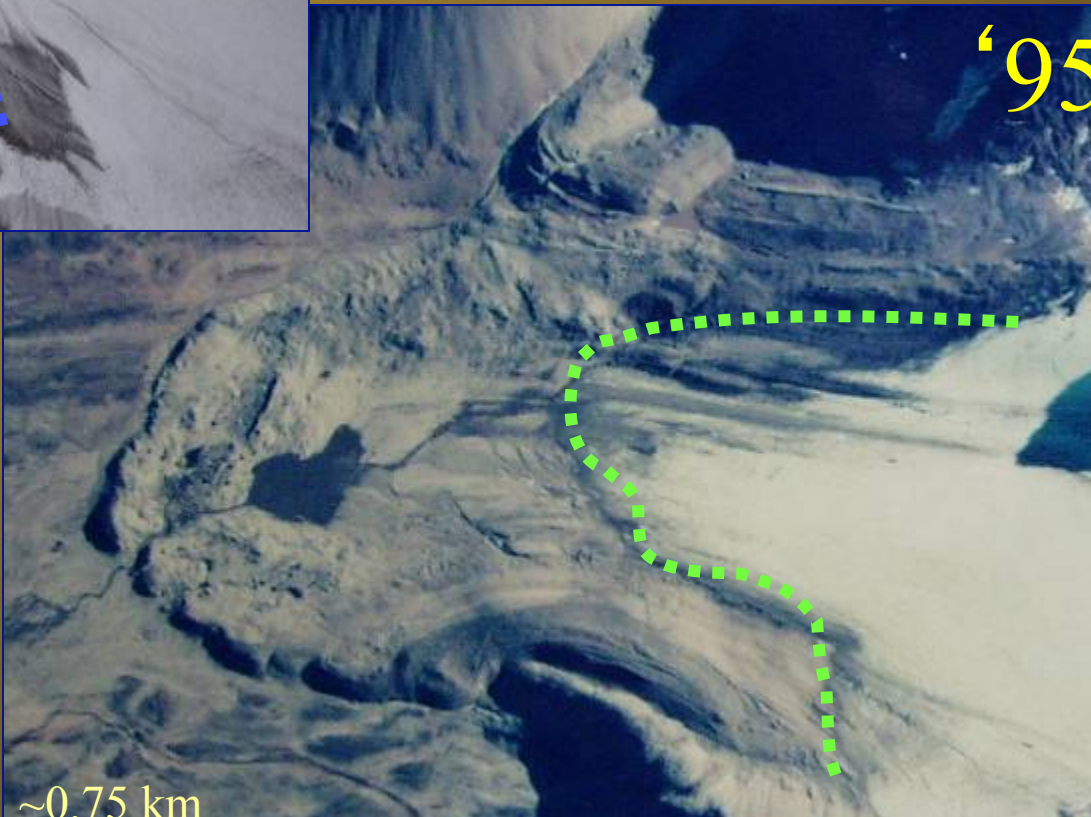


1936

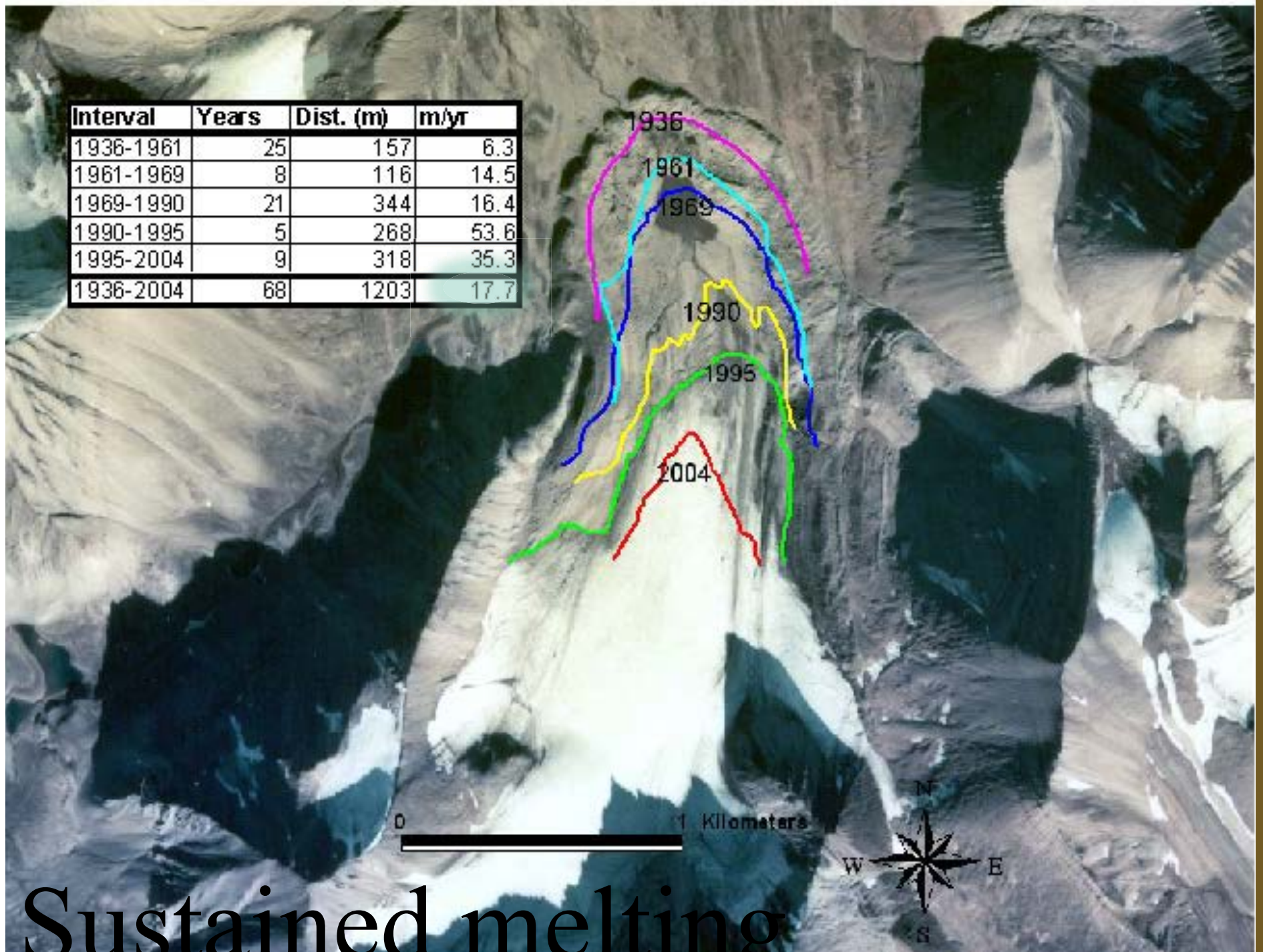




Glacial Retreat



Interval	Years	Dist. (m)	m/yr
1936-1961	25	157	6.3
1961-1969	8	116	14.5
1969-1990	21	344	16.4
1990-1995	5	268	53.6
1995-2004	9	318	35.3
1936-2004	68	1203	17.7



Sustained melting

Glacier Work



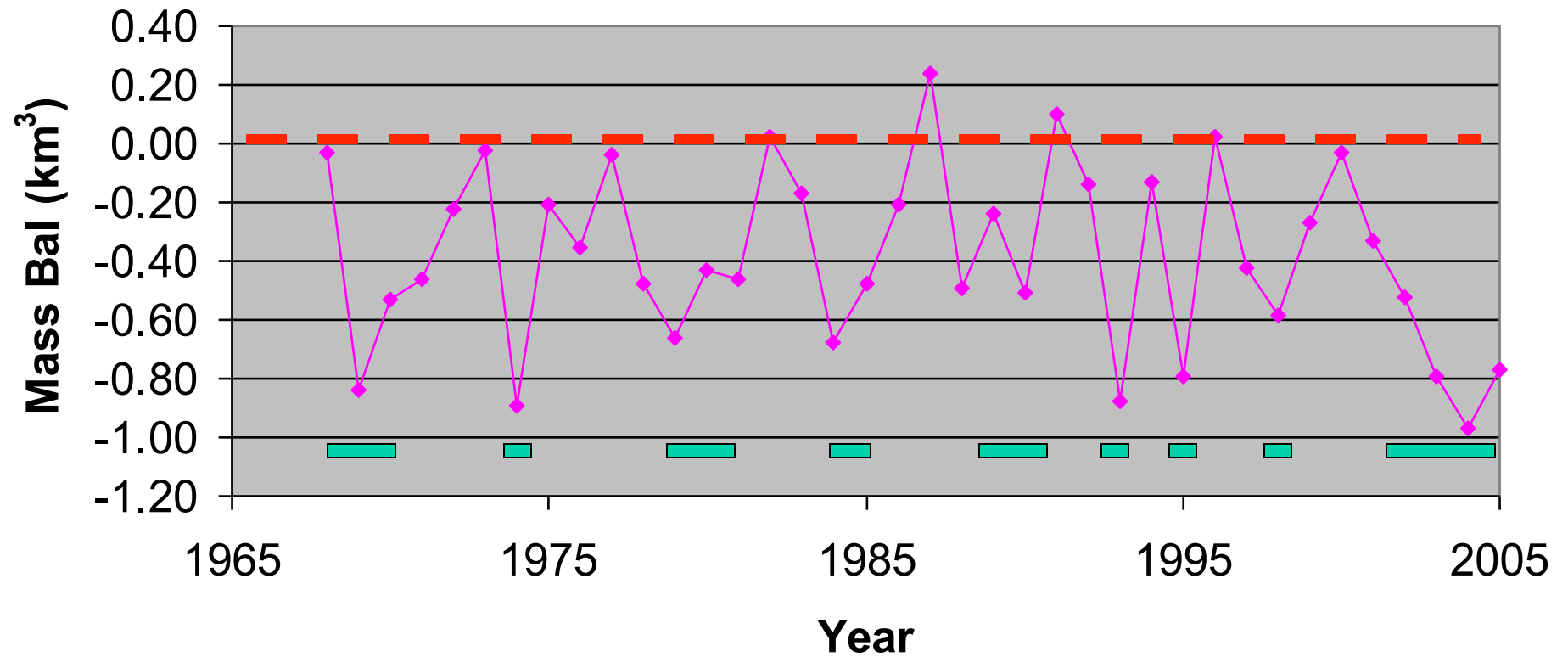
- ✓ Annual Mass Balance
- ✓ Daily Ablation
- ✓ Ablation Processes
- ✓ Sediment Flux



Glacier Mass Balance

Midre Lovenbreen

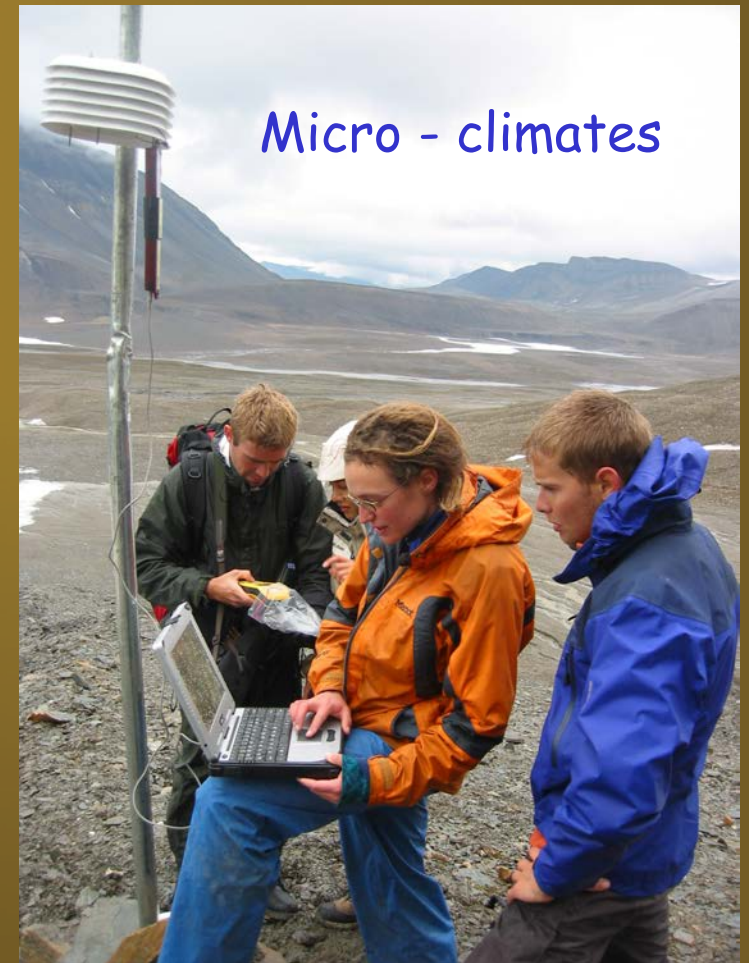
NyAalesund



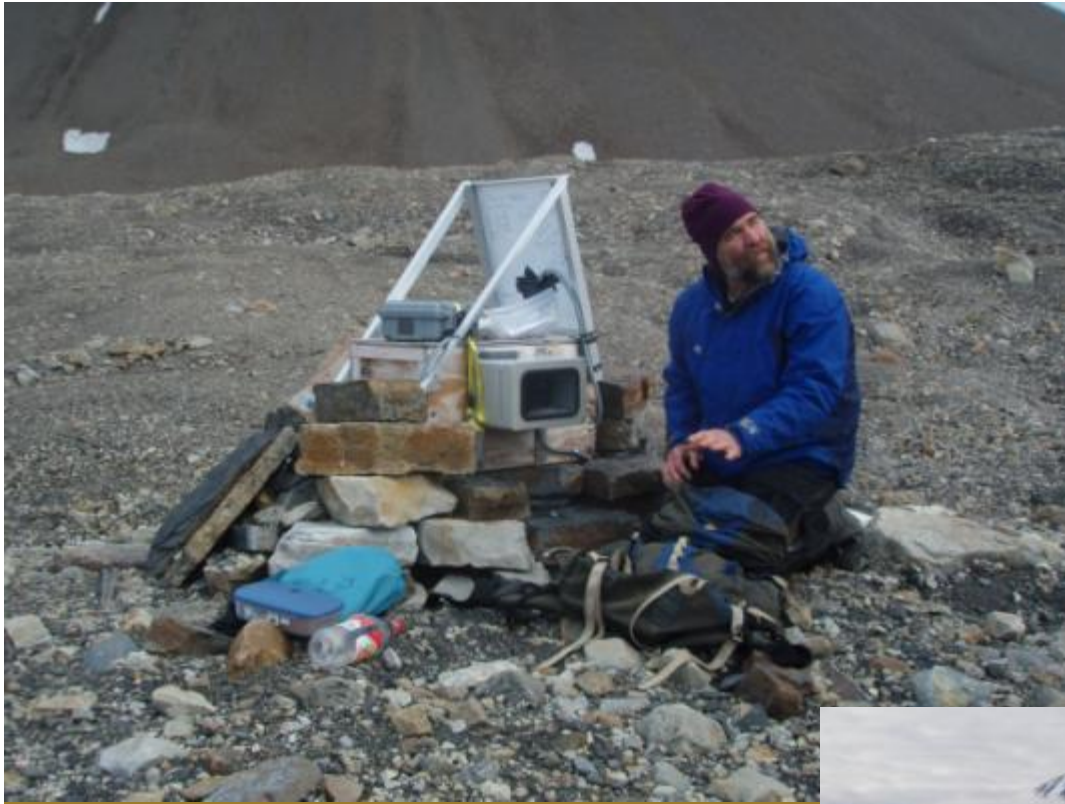
Local conditions



Weather/Climate



Micro - climates



Plume Cam



Inflow Stream

- Discharge/stage
- Temperature
- Sediment load



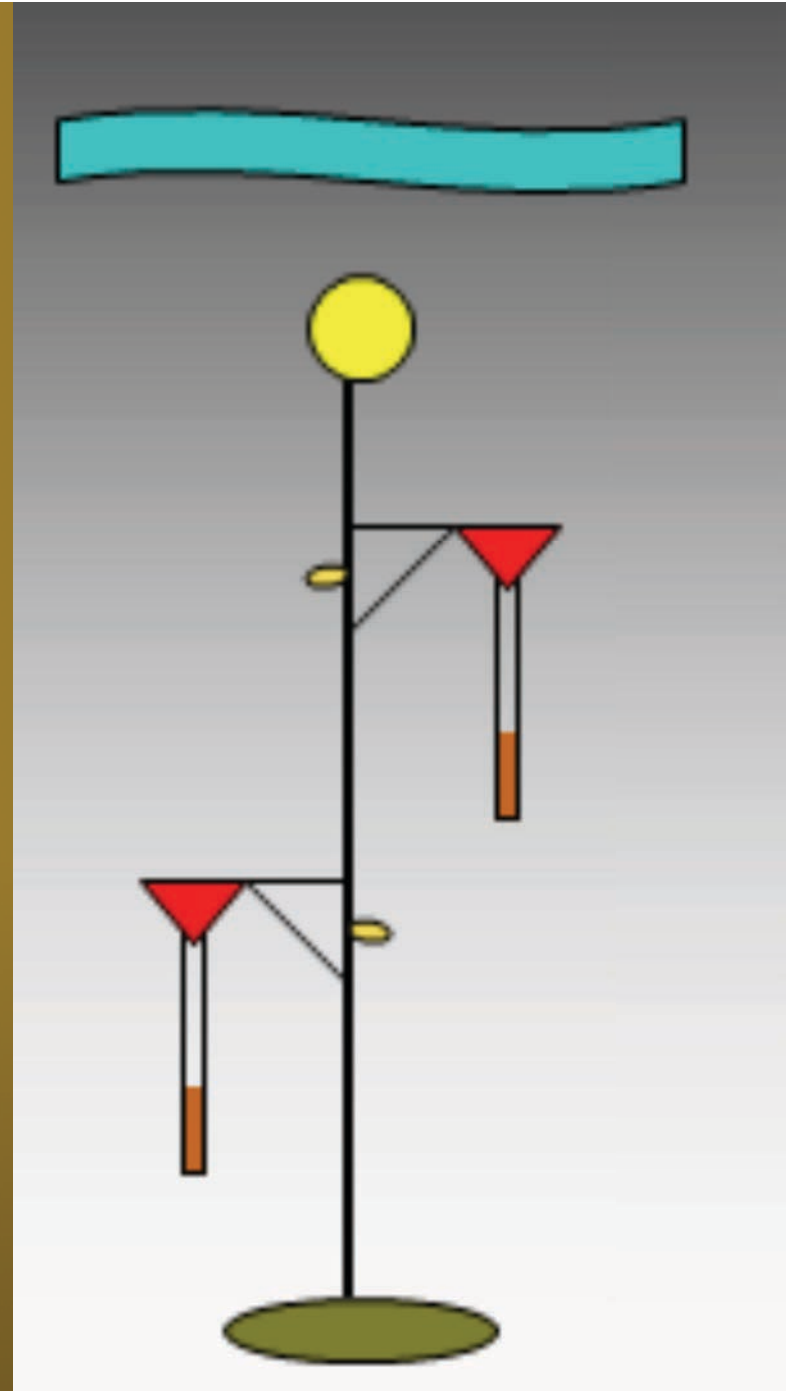


How much
of what type
of sediment,
where?



Lake Moorings

- Sediment Traps
- Temperature loggers
- CTD (turbidity)
- Intermolmeter



Research Goals

➤ **Monitor:**

- ✓ local weather
- ✓ glacial system
- ✓ meltwater system
- ✓ lacustrine system

➤ **Calibrate:** lamination stratigraphy

➤ **Interpret:** past environmental change

What's in it for the teacher...



Part of a dynamic group!



Expand your comfort level!



Learn new things!



Adventures and Accomplishments



Help with
student
research!



Our voice – broader impacts!



Polar Trec... a win-win for all involved!

The image shows a screenshot of the PolarTREC website homepage. At the top left is the logo for PolarTREC, with the tagline "TEACHERS AND RESEARCHERS EXPLORING AND COLLABORATING". To the right of the logo is a "LOGIN" button. Below the logo is a navigation menu with links for HOME, ABOUT, EN ESPAÑOL, VIRTUAL BASE CAMP, NEWSROOM, FOR TEACHERS, FOR RESEARCHERS, RESOURCES, and SEARCH. The main content area features a large banner image of an expedition team in a snowy landscape. To the right of the banner is a section titled "Find a Team Member" with a search input field and a "Locate" button. Below the banner is a section titled "PolarConnect Events for Educators!" with a "Register Today!" link. The bottom of the page is divided into four colored boxes: "Learning Resources" (green), "PolarConnect" (orange), a box with a microscope and a person's face (orange), and a box with a globe (blue).

POLAR TREC TEACHERS AND RESEARCHERS EXPLORING AND COLLABORATING

LOGIN

HOME ABOUT EN ESPAÑOL VIRTUAL BASE CAMP NEWSROOM FOR TEACHERS FOR RESEARCHERS RESOURCES SEARCH

Find a Team Member

Use the text field above to locate a PolarTREC member.

Locate

**Follow an Expedition...
VISIT THE Virtual Base Camp!**

PolarConnect Events for Educators!

Join us for special events on 30 July with Dr. Al Werner and 7 August with Missy Holzer. Topics will include high arctic geosciences, teachers in field research, and earth science in the classroom. Log in and learn!

Register Today!

Learning Resources

PolarConnect



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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!**



TEACHERS AND RESEARCHERS
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Upcoming Events

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



TEACHERS AND RESEARCHERS
EXPLORING AND COLLABORATING

Thank You!

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

