



TEACHERS AND RESEARCHERS  
EXPLORING AND COLLABORATING

# Welcome to a Special Live Event!

with Professor Sarah Hardy

UAF School of Fisheries and Ocean Sciences

CISE Fall 2012 Professional Development

**14 November 2011**

Sponsoring Partner

**COSEE**  
CENTERS FOR OCEAN SCIENCES  
EDUCATION EXCELLENCE

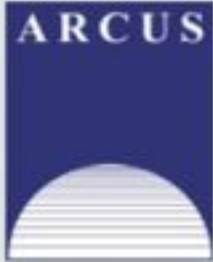
**ALASKA**  
PEOPLE, OCEANS AND CLIMATE CHANGE  
WWW.COSEEALASKA.NET

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



Wimba Classroom - Arctic Research Consortium of the United States (ARCUS)

# WELCOME TO WIMBA



ARCTIC RESEARCH CONSORTIUM OF THE UNITED STATES

Connection strength: [Signal strength icon]

TALK [Microphone icon]

Options [Settings icon]

Exit - Lobby - Help

Chat window:  
You have entered the lobby.  
You have entered 'Arctic Research Consortium of the United States (ARCUS)'.  
Your media format is WimbaMedia.  
You say, "I'm going to change the slide momentarily- to show the one I need for my new screen shot!"  
To: Main Room

People (3)	
Kristin_Timm	[Mute] [Unmute]
kristina_creek	[Mute] [Unmute]
Kristin_Timm	[Mute] [Unmute]

Slides will be shown here

If using VOIP, press and hold here to talk

Your connection strength

'Chat' with one person or the entire group

Raise your hand to ask a question

List of all participants

Return to the lobby or exit

**Please note:**

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

# Participant Introductions

**When called, please state your:**

- ✓ Name
- ✓ School / Institution
- ✓ 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.

# Questions

## **To Ask a Question:**

- ✓ Raise your hand with the “hand button”
- ✓ Type your question in the text chat box
- ✓ Voice Over IP, Press “talk button” while speaking and then release.
- ✓ Speak loud and clear and directly into the phone to ask your question.



An aerial photograph of sea ice, showing a complex pattern of ice floes and leads. The ice is a mix of light and dark grey tones, with some areas appearing more textured and others smoother. The text is overlaid on the left side of the image.

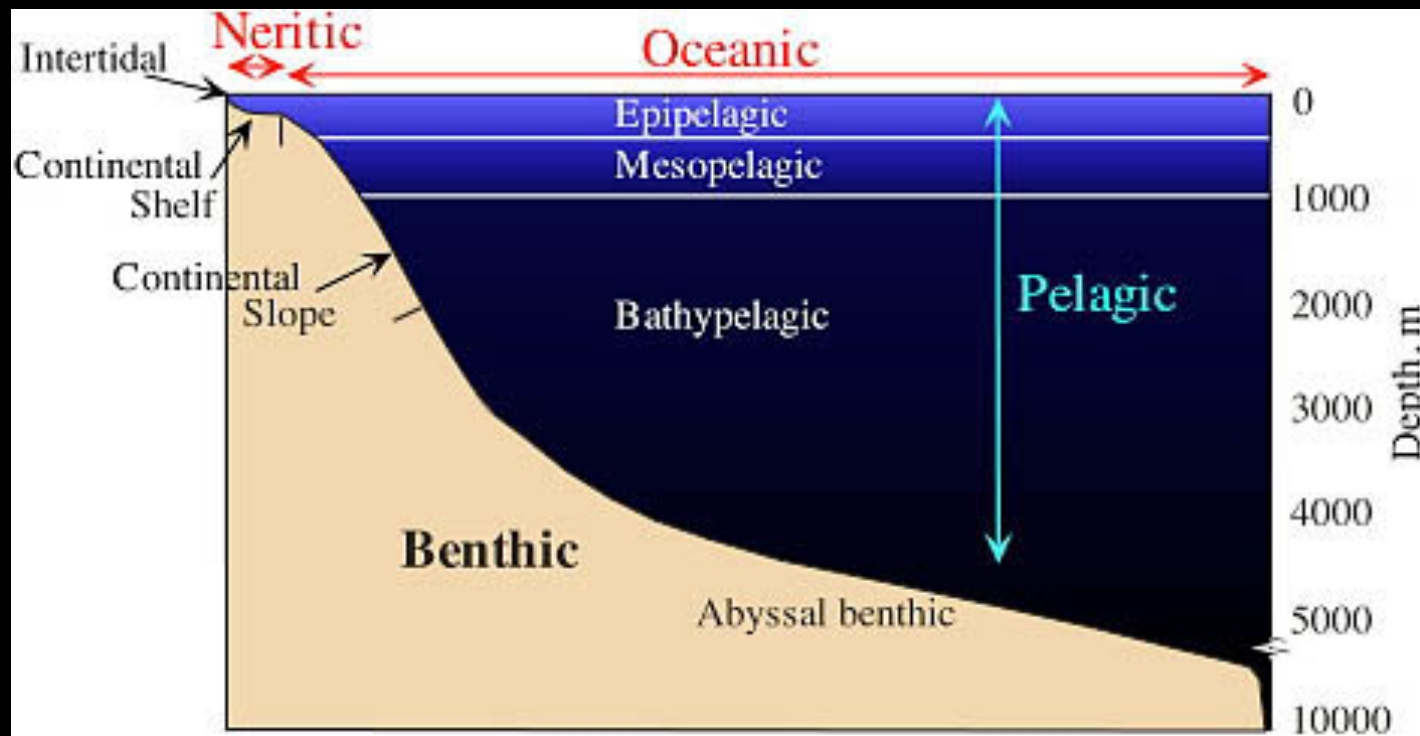
**Sea ice in polar ecosystems:**  
It's not just good for polar  
bears...

Dr. Sarah Hardy  
University of Alaska, Fairbanks  
School of Fisheries and Ocean Sciences



# The Benthic Environment

- It's dark down there!
- Most food is produced in the lighted surface waters
- Food can be very patchy

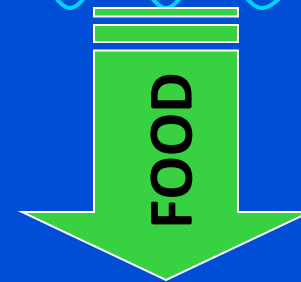




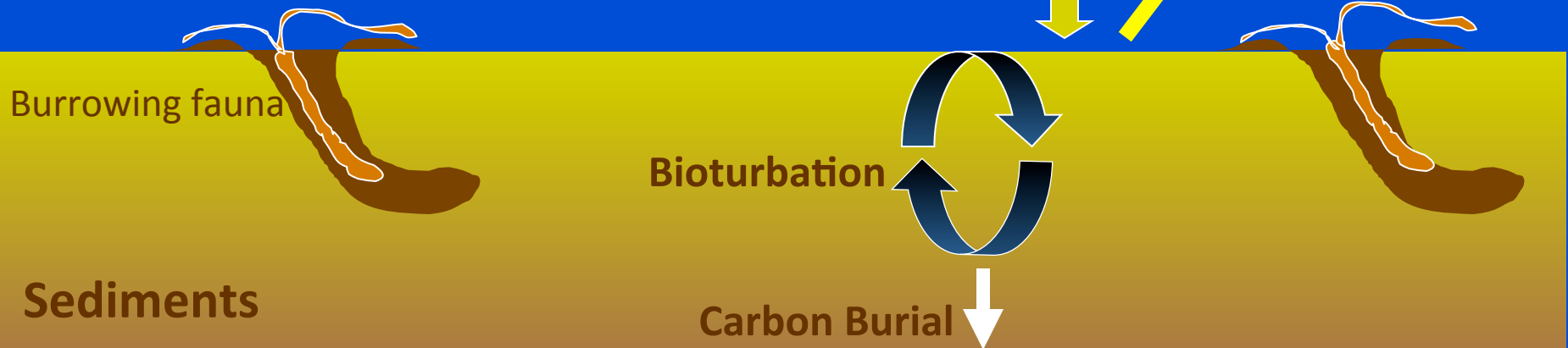
# Benthic-pelagic coupling



- Sediment mixing (“bioturbation”) rates
- Nutrient regeneration
- Abundance of seafloor organisms
- Biological processes

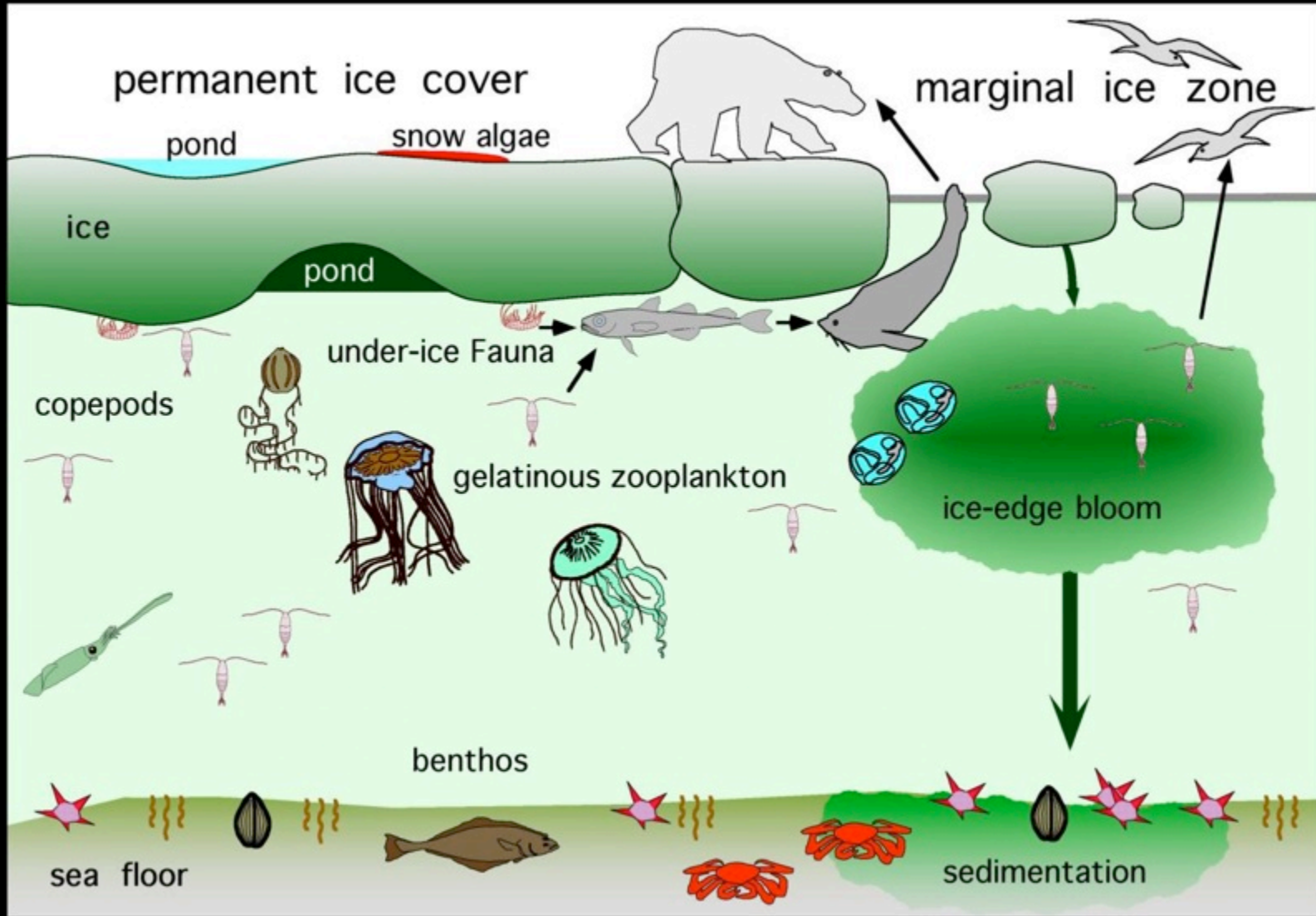


Recycled nutrients



# CRYO-benthic-pelagic coupling

Sympagic  
Pelagic  
Benthic



(Gradinger et al. 2010)

# Polar research vessels







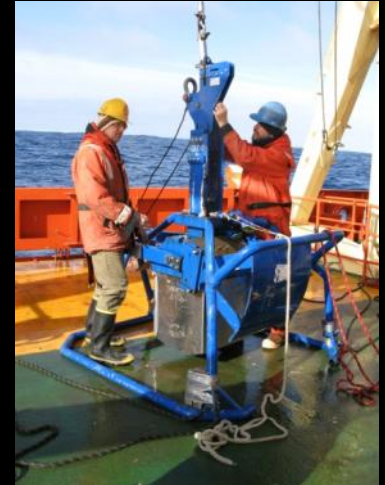


# Tools of the trade

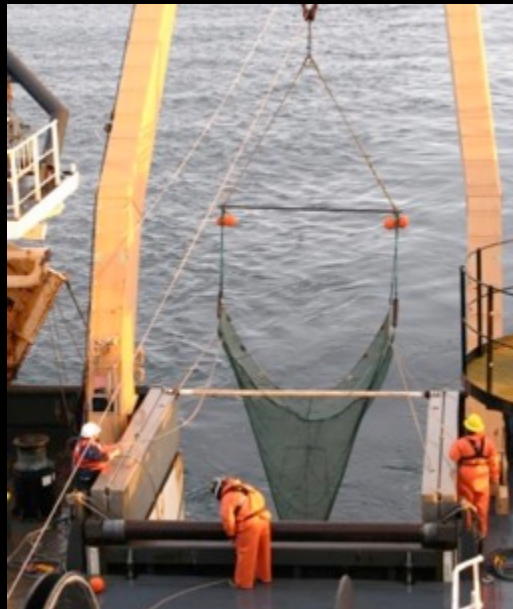
## Sediment traps



## Sediment cores and grabs



## Nets



## Cameras











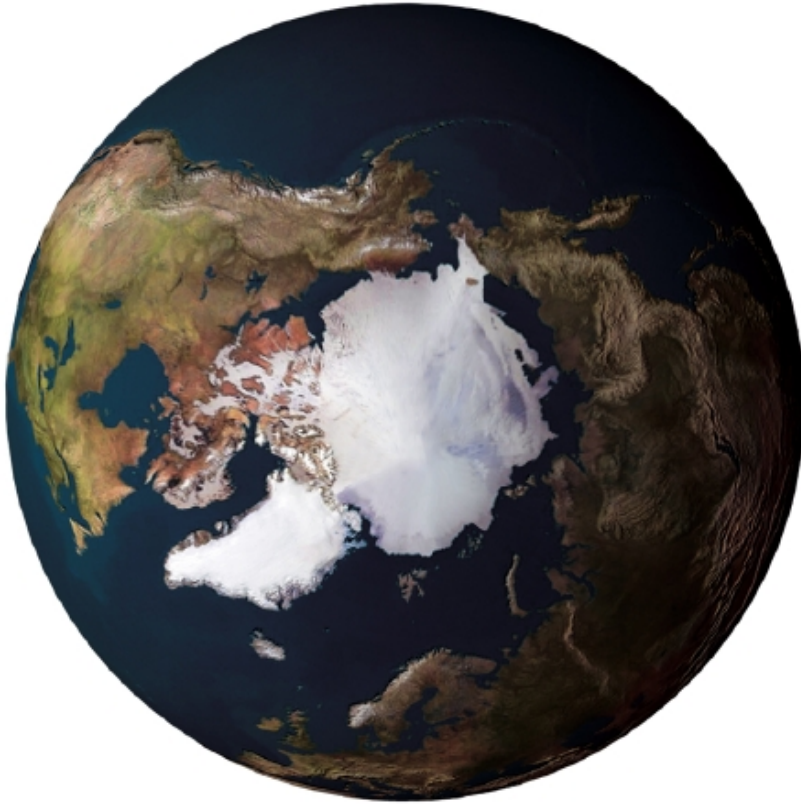








# Arctic vs. Antarctic



- Ocean surrounded by land
- Shallow shelf (50 m)
- Floating sea ice
- Terrestrial / riverine input
- Human presence

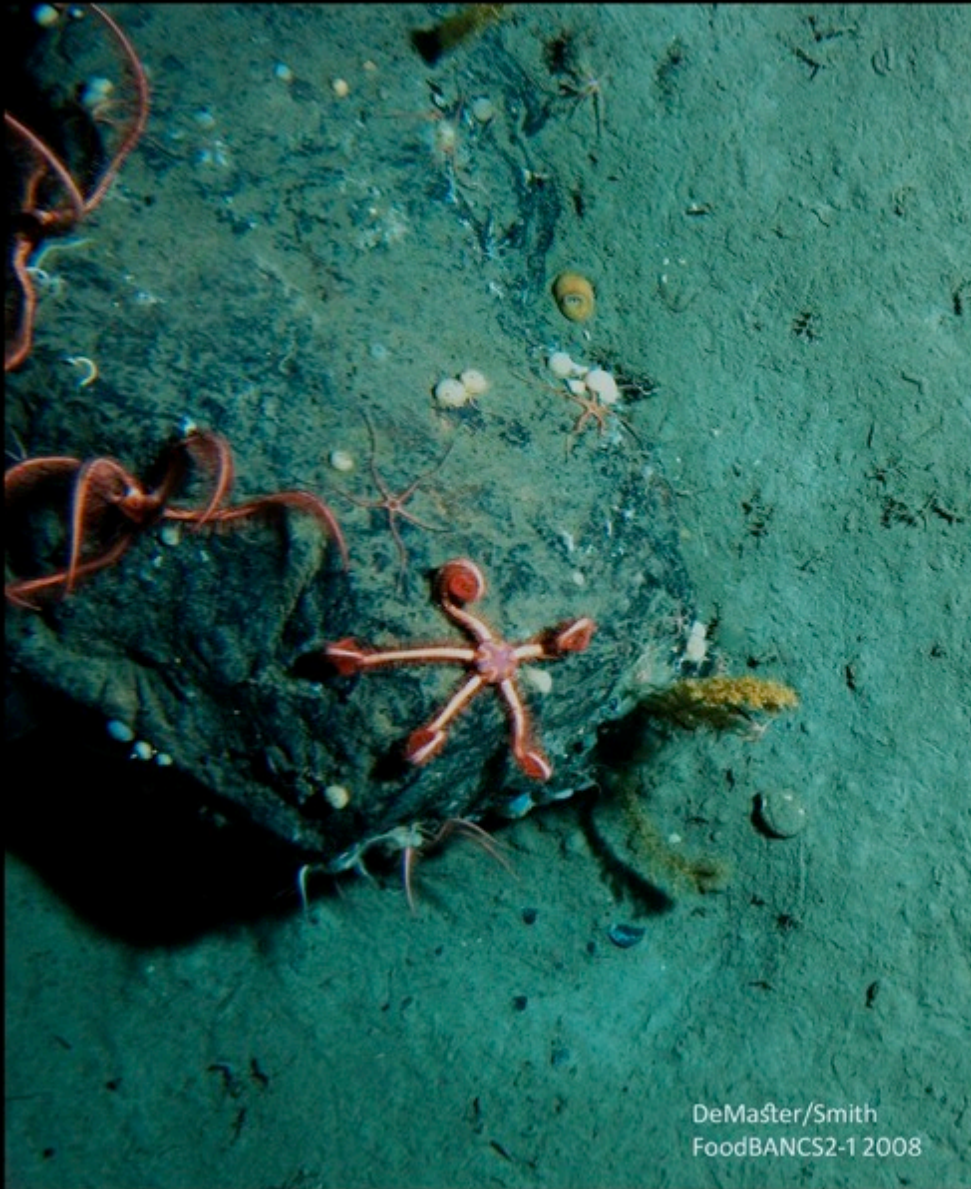


- Land surrounded by ocean
- Deep shelf (500 m)
- Land-fast ice







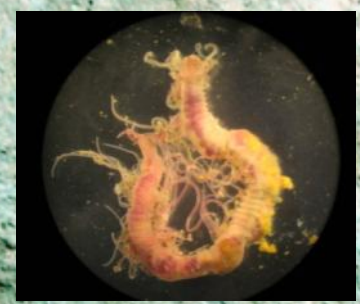
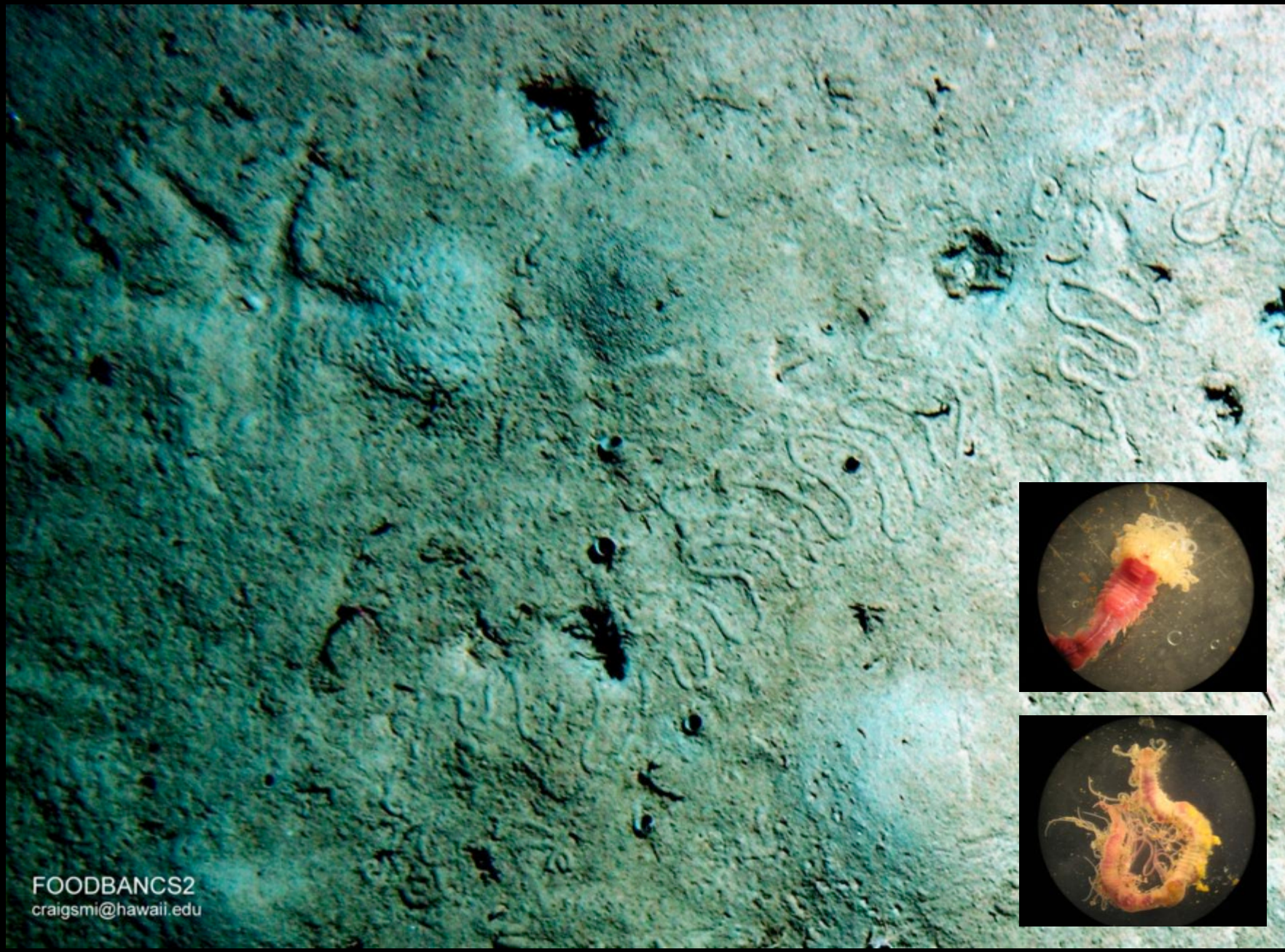


# Polar Benthos





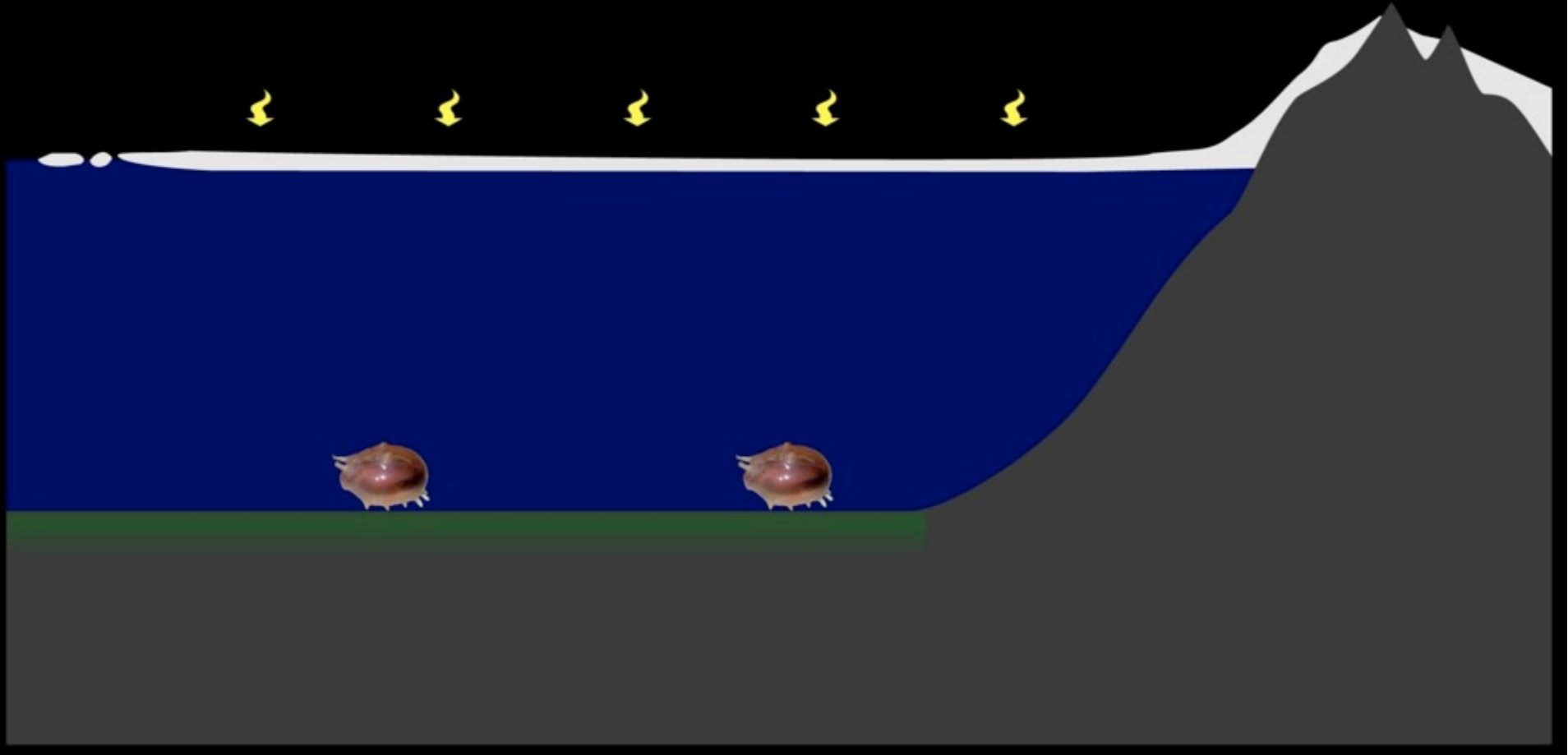




FOODBANCS2  
craigsmi@hawaii.edu

# Early Spring

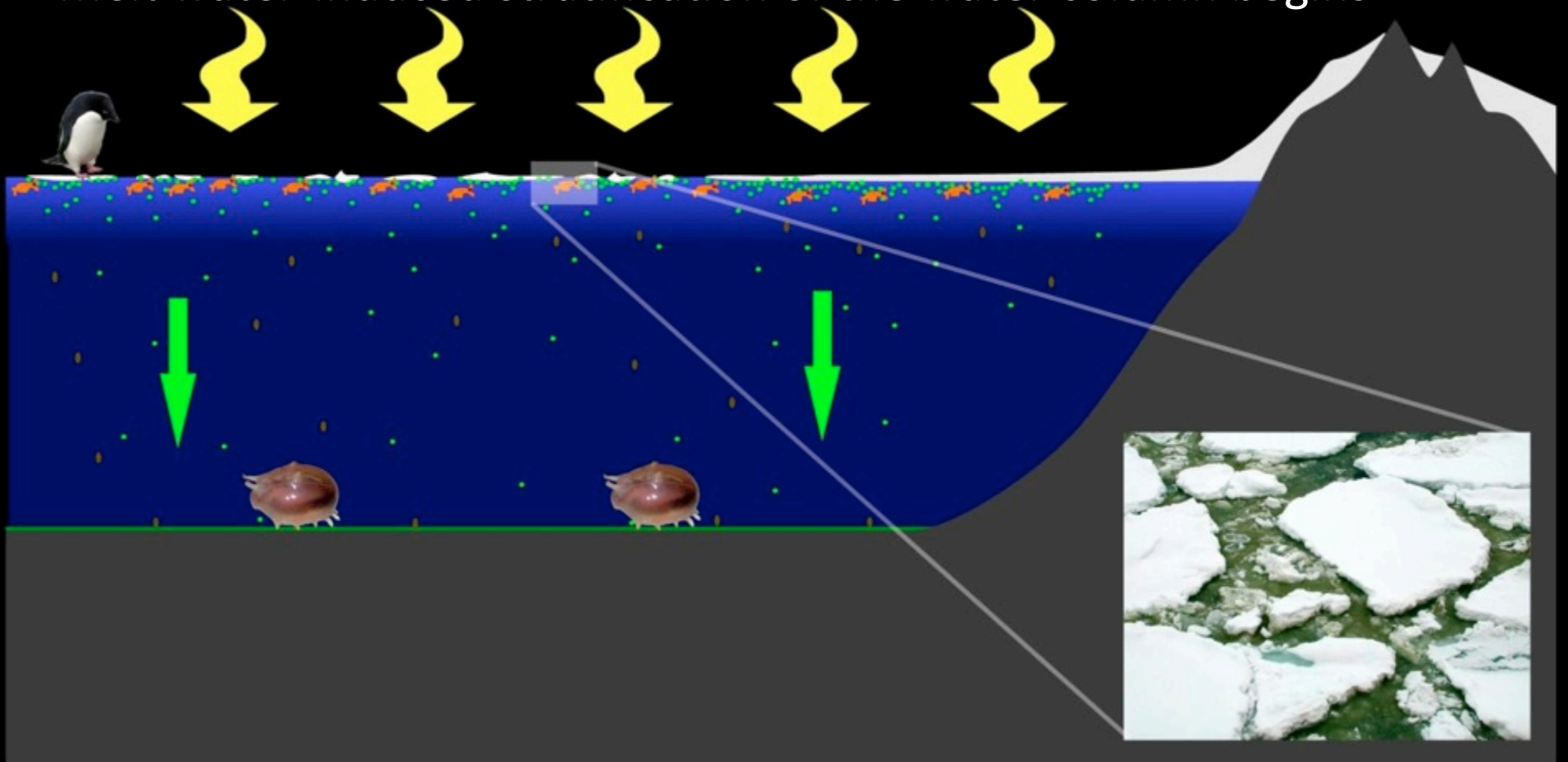
- Maximum sea-ice coverage, 10+ hours daylight
- Relatively clear water column (i.e., no phytoplankton)





# Late Spring

- Sea-ice cover breaking up; nearing 24 hr daylight
- Ice-algae released by melting ice; krill feeding
- Melt water-induced stratification of the water column begins

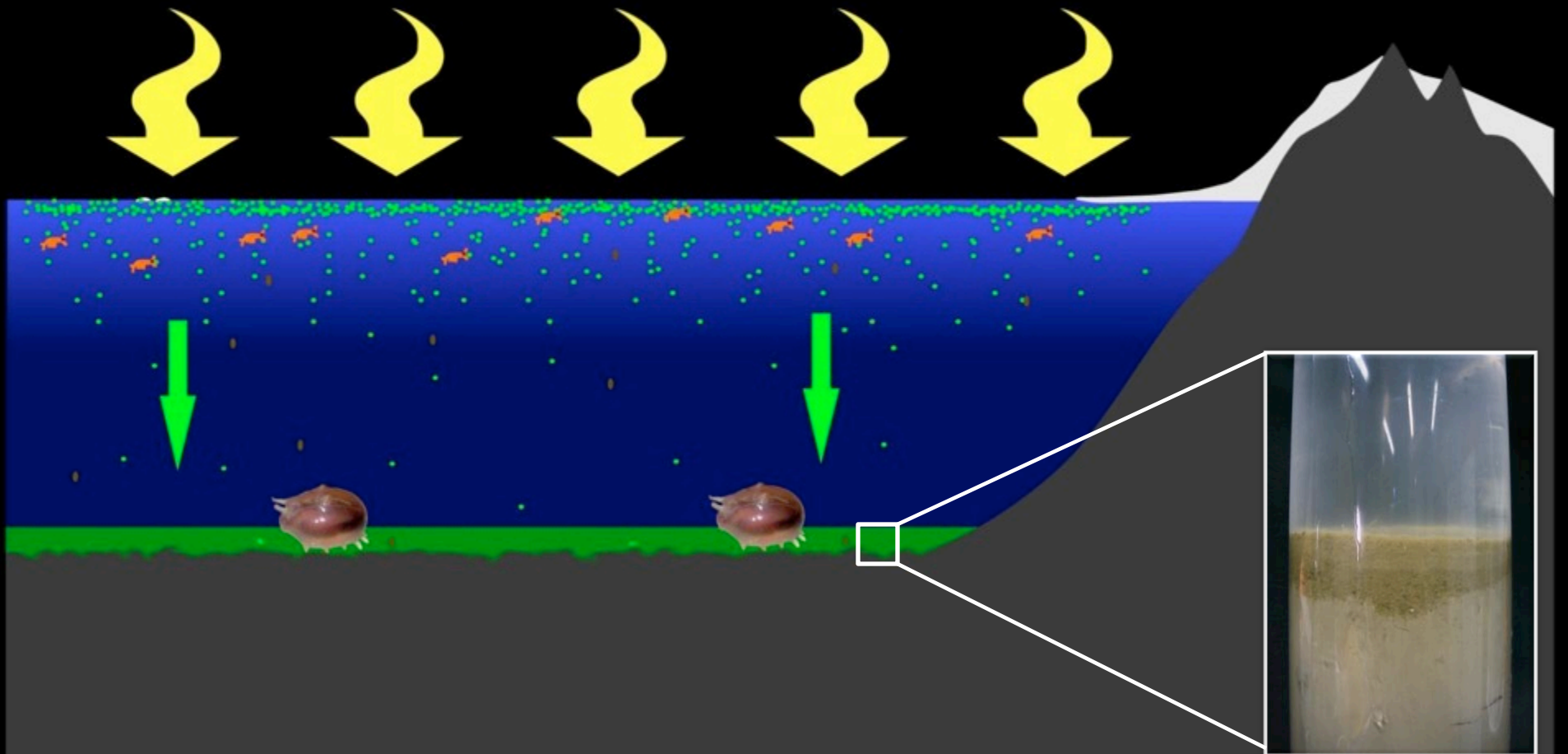




# Summer

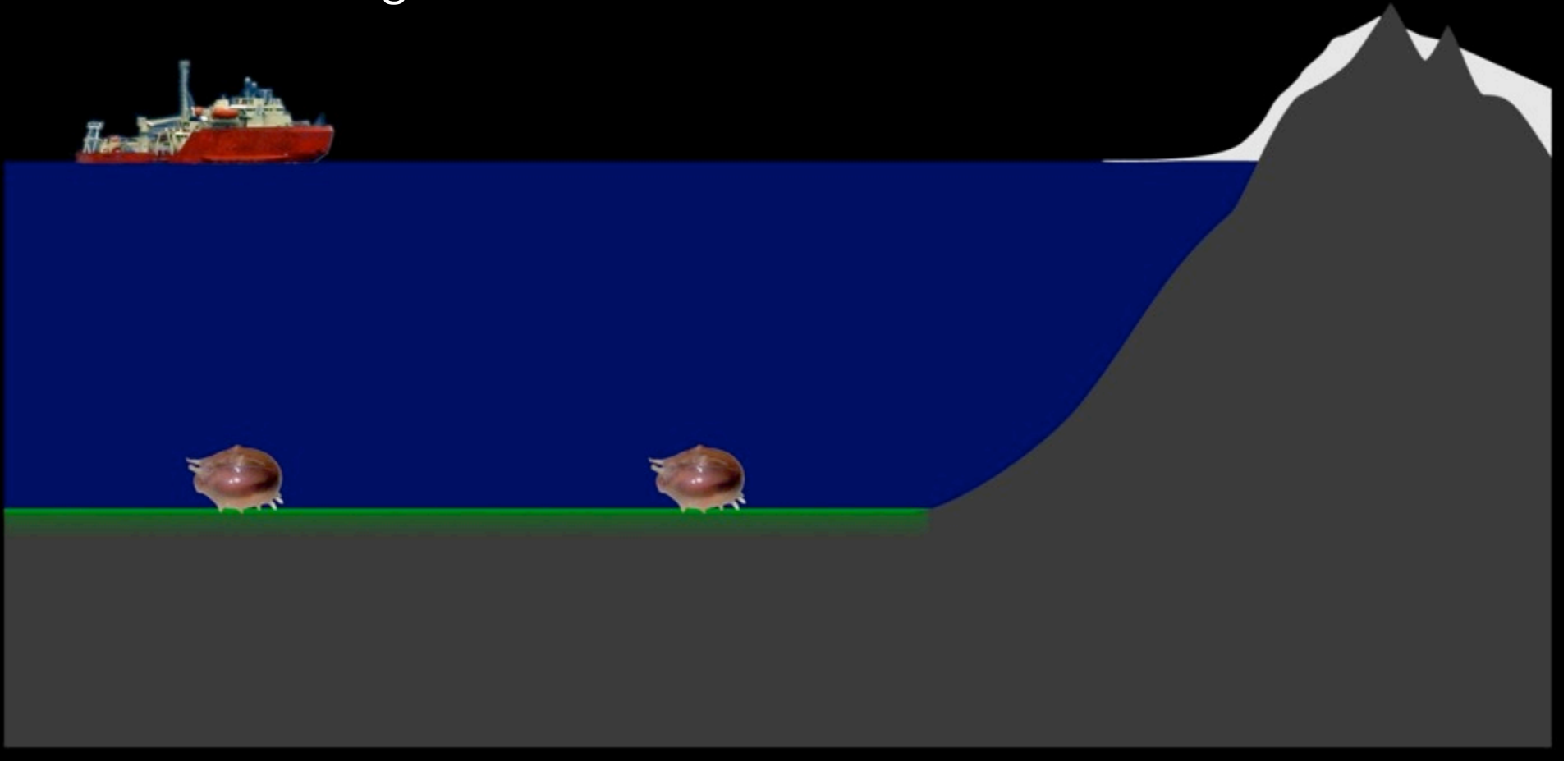
-Sea-ice cover has receded

-Phytoplankton bloom fully developed; rapid sinking food particles

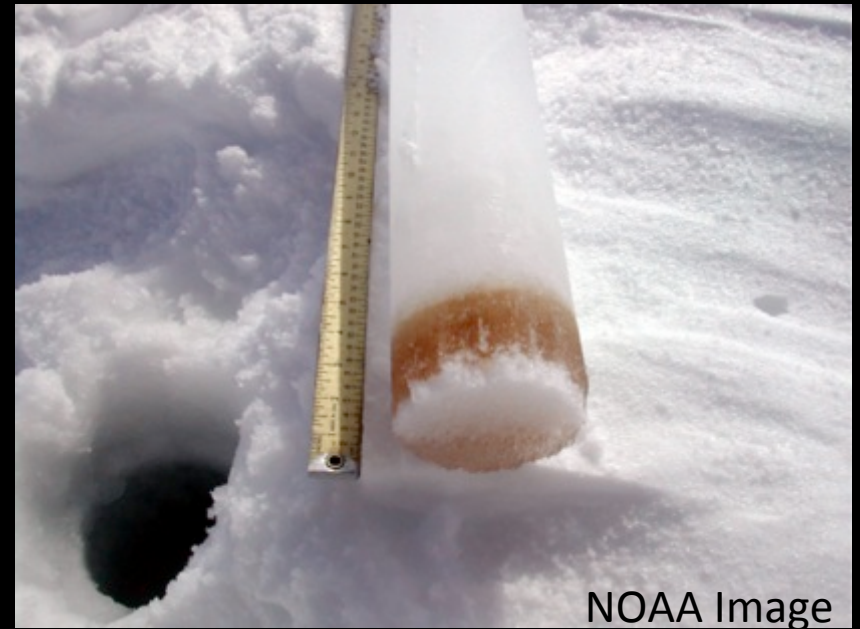


# Fall / Winter

- ~24 hr darkness, minimal sea-ice cover
- Relatively clear water column
- Benthos feeding on “leftovers”?



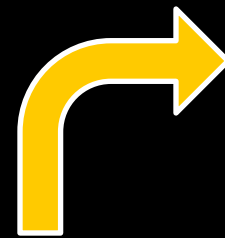
# Food from the ice



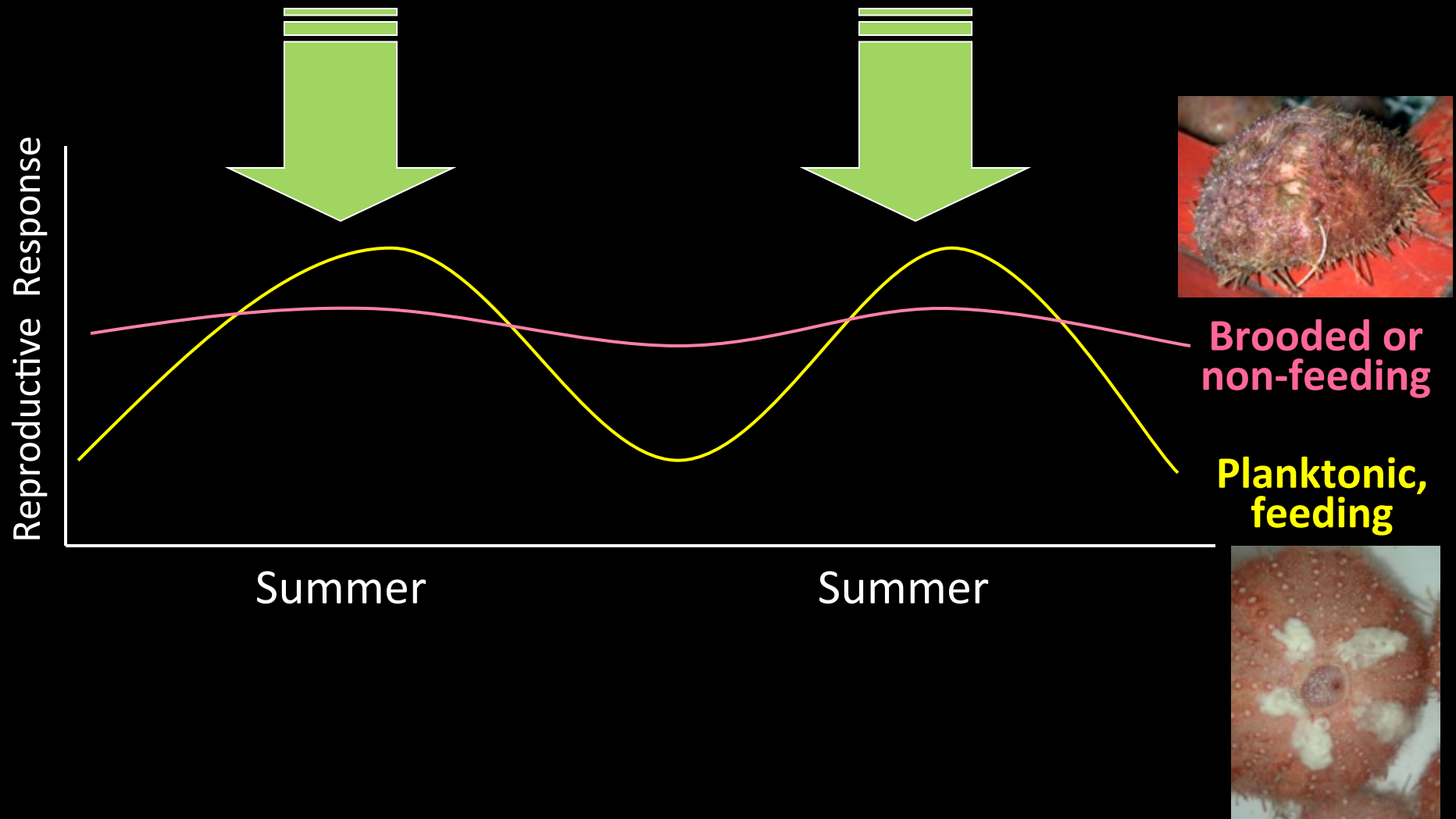


# Food flux and benthic life cycles

- Do patterns in food availability make particular reproductive strategies more successful?
- Will changes in food quality impact reproductive success?



# Seasonal reproductive strategies?





North Atlantic  
Ocean

Iceland

NASA Earth Observatory

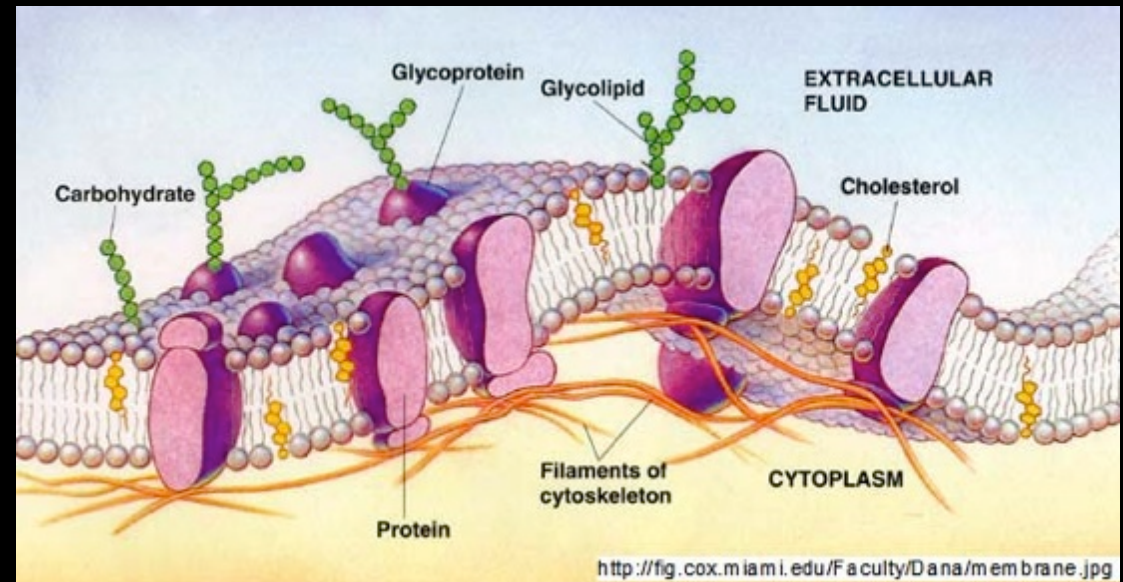
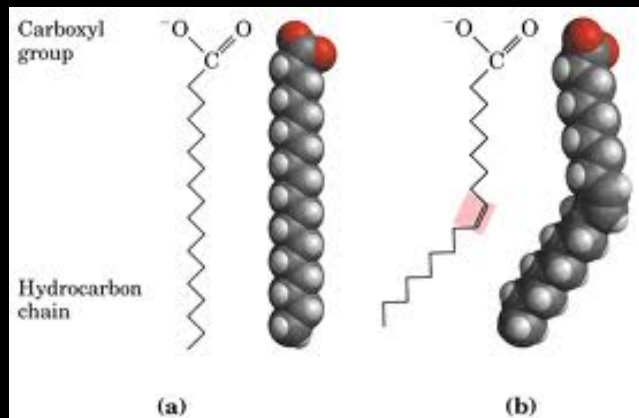
25 km





# Differences in food quality?

- Ice algae are high in fatty acids
- Fatty acids ( $\omega$ -3) are essential dietary components
- Fatty acids cannot be synthesized by most animals
- Levels of essential PUFAs in algal feed are known to affect larval development in invertebrates



# Current projects

- Field collections of Arctic species to examine incorporation of fatty acids into body tissues
- Controlled feeding experiments with captive sea cucumbers to examine diet effects on reproduction and development





# Questions?





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# Teachers: Join PolarTREC!

[www.polartrec.com/about/join](http://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!**





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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.polar-trec.com/polar-connect/archive>



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