



Welcome to:

## Live from IPY!

*with PolarTREC Teacher, Jeff Peneston &  
the team onboard the Icebreaker Oden*



15 December 2008

8:30AM Alaska Standard Time [7:30AM HST, 9:30AM PST, 10:30AM MST, 11:30AM CST, 12:30PM EST]

*If you will be joining the audio portion by telephone, dial 1-800-315-6338 (78732#), 5-10 minutes prior to the start of the event.*



# 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 slide displays "Welcome to HorizonWimba" and the ARCUS logo. Below the slide is a toolbar with a "TALK" button circled in red. A chat window at the bottom left shows a conversation. On the right, a "People (3)" list shows participants: Janet\_Warburton, ronnie, and tina. At the bottom right, a navigation bar includes "Exit - Lobby - Help" options, with "Exit - Lobby - Help" circled in red. Arrows from text labels on the right side of the image point to the "People" list, the "Raise your hand" icon, and the "Exit - Lobby - Help" options. Arrows from text labels on the left side point to the "TALK" button and the chat window. An arrow from the top-left text label points to the main content area.

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

# Roll Call

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When called, please state your:

- Name
- School / Institution
- The number of students participating today

# 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)***



## What is PolarTREC?

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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 over 40 teachers from around the United States will join scientists in the Arctic and Antarctica in celebration of the International Polar Year!

***[www.polartrec.com](http://www.polartrec.com)***

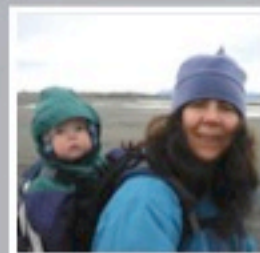
# The PolarTREC Team



**Wendy Warnick**  
PolarTREC PI  
Executive Director



**Helen Wiggins**  
Program Coordinator



**Janet Warburton**  
PolarTREC  
Project Manager



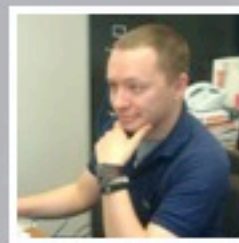
**Kristin Timm**  
PolarTREC  
Project Manager



**Ronnie Owens**  
Web Developer



**Ben Wade**  
Web Developer



**Zeb Polly**  
Systems Administrator



**Joed Polly**  
Video Production

...with help from the  
entire staff at ARCUS

ARCUS





Jeff Peneston  
Liverpool High School



Dr. Tish Yager  
Univ. of Georgia



Dr. Walker Smith  
Co Chief Scientist



Kevin Bakker  
Masters Student



Brett Heilich  
Undergraduate Student



Alex Mass  
PhD Student



Thomas Strömsnäs  
Chief Officer of the Oden



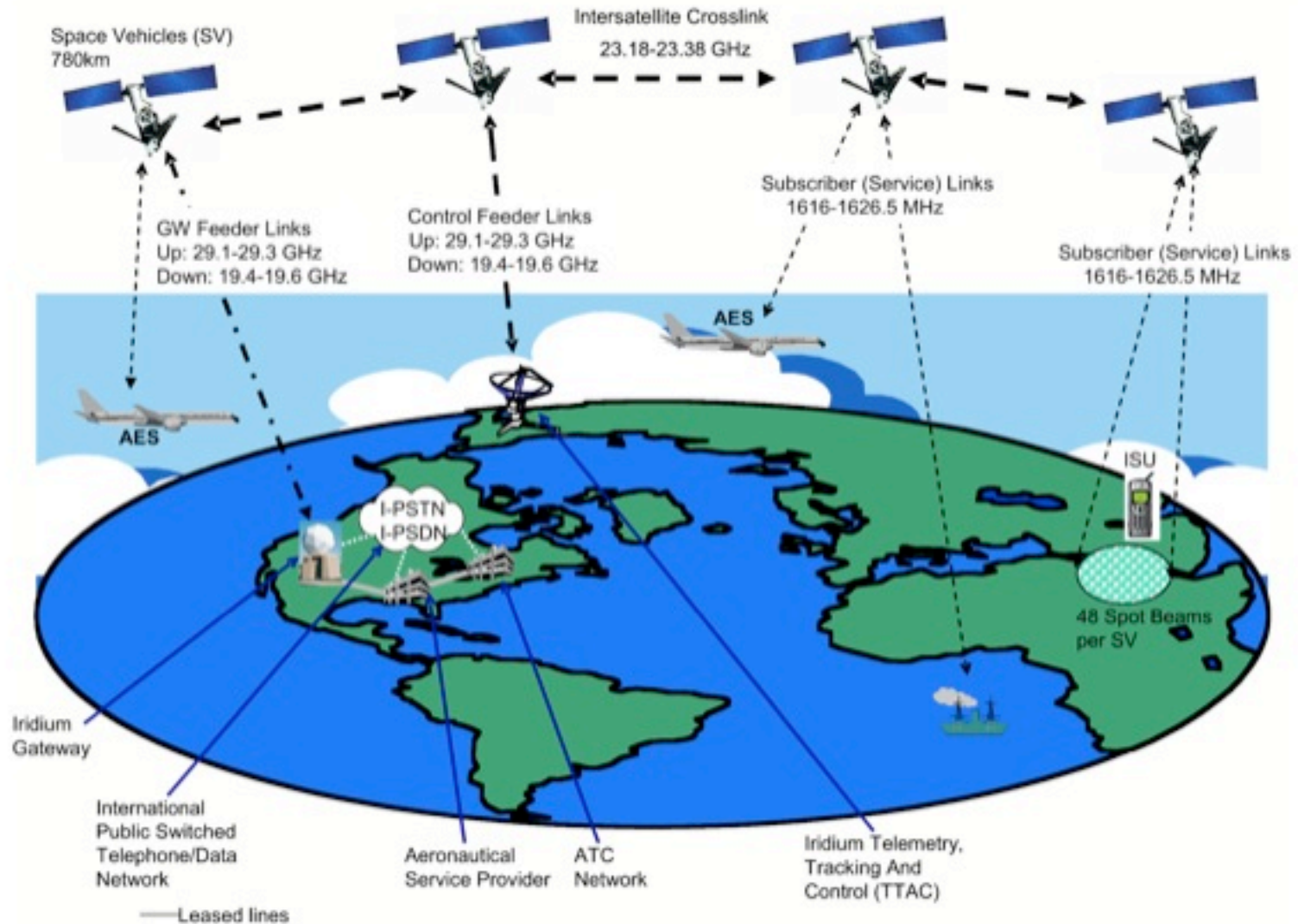
Anna Wåhlin  
University of Gothenburg



# Live from IPY Connections Around the World!

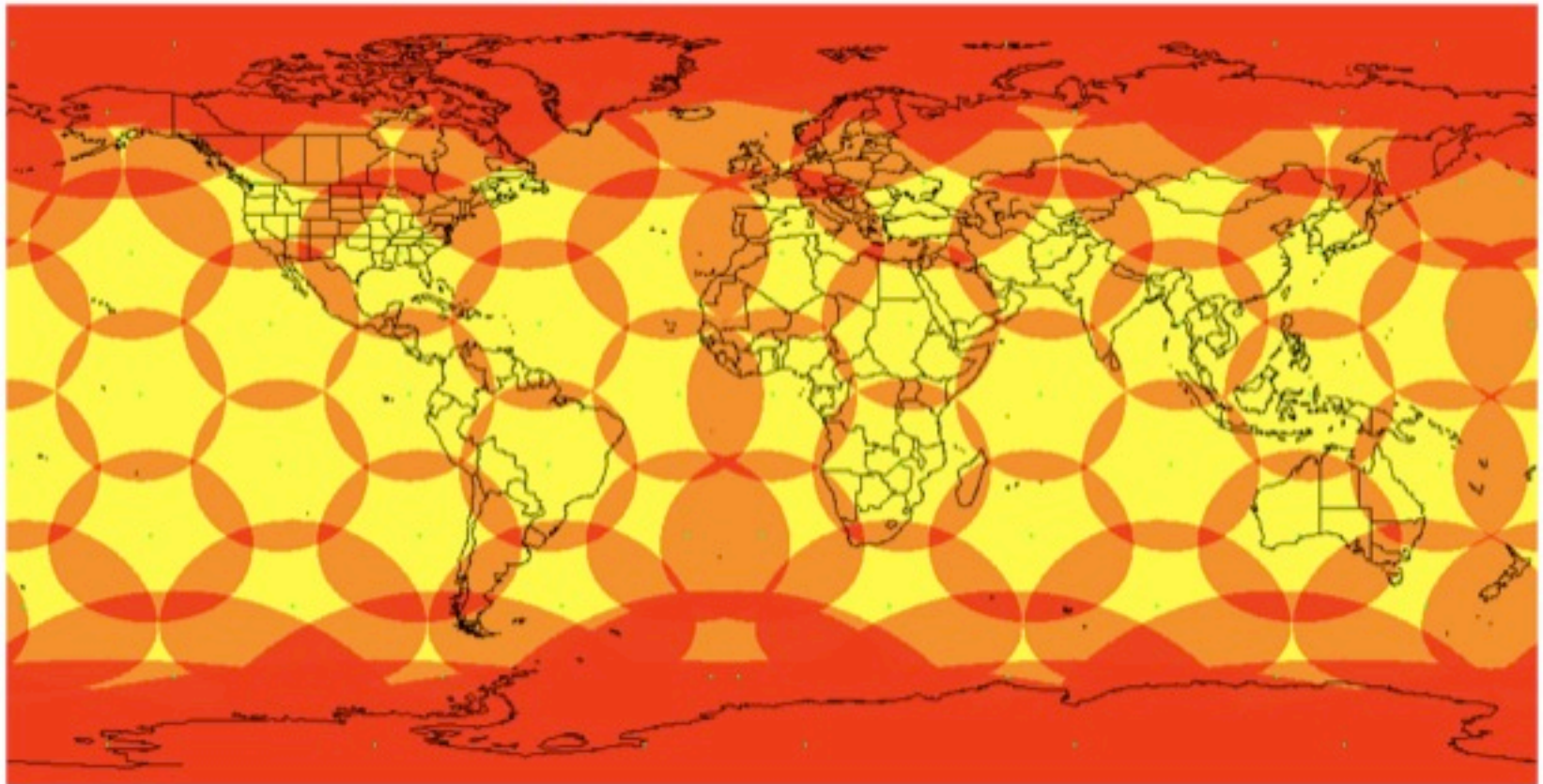


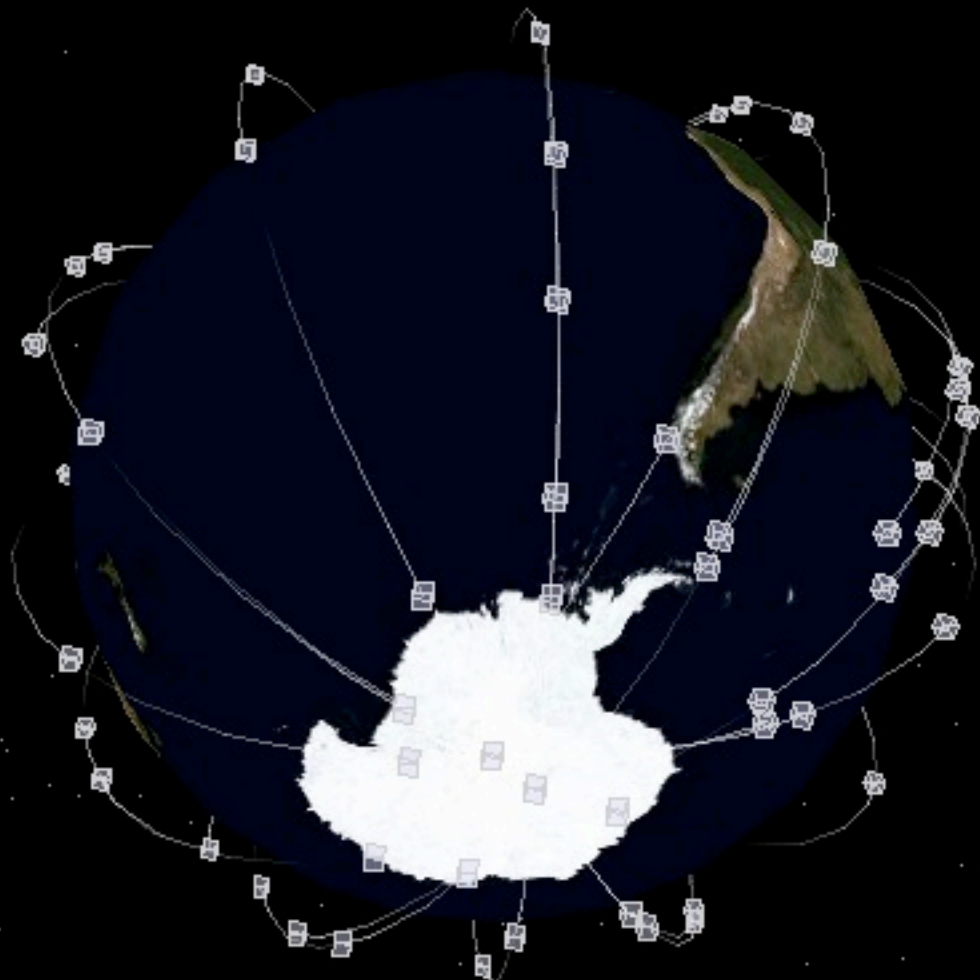
# Iridium Satellite System



# Iridium Coverage Map

*Mercator map of coverage of the Iridium constellation,  
with 66 active satellites in 6 planes of 11.*





# Where are Mr. Peneston & the Team?



Swedish Icebreaker *Oden*  
Leaving Montevideo, Uruguay





Approximate  
Current  
Location

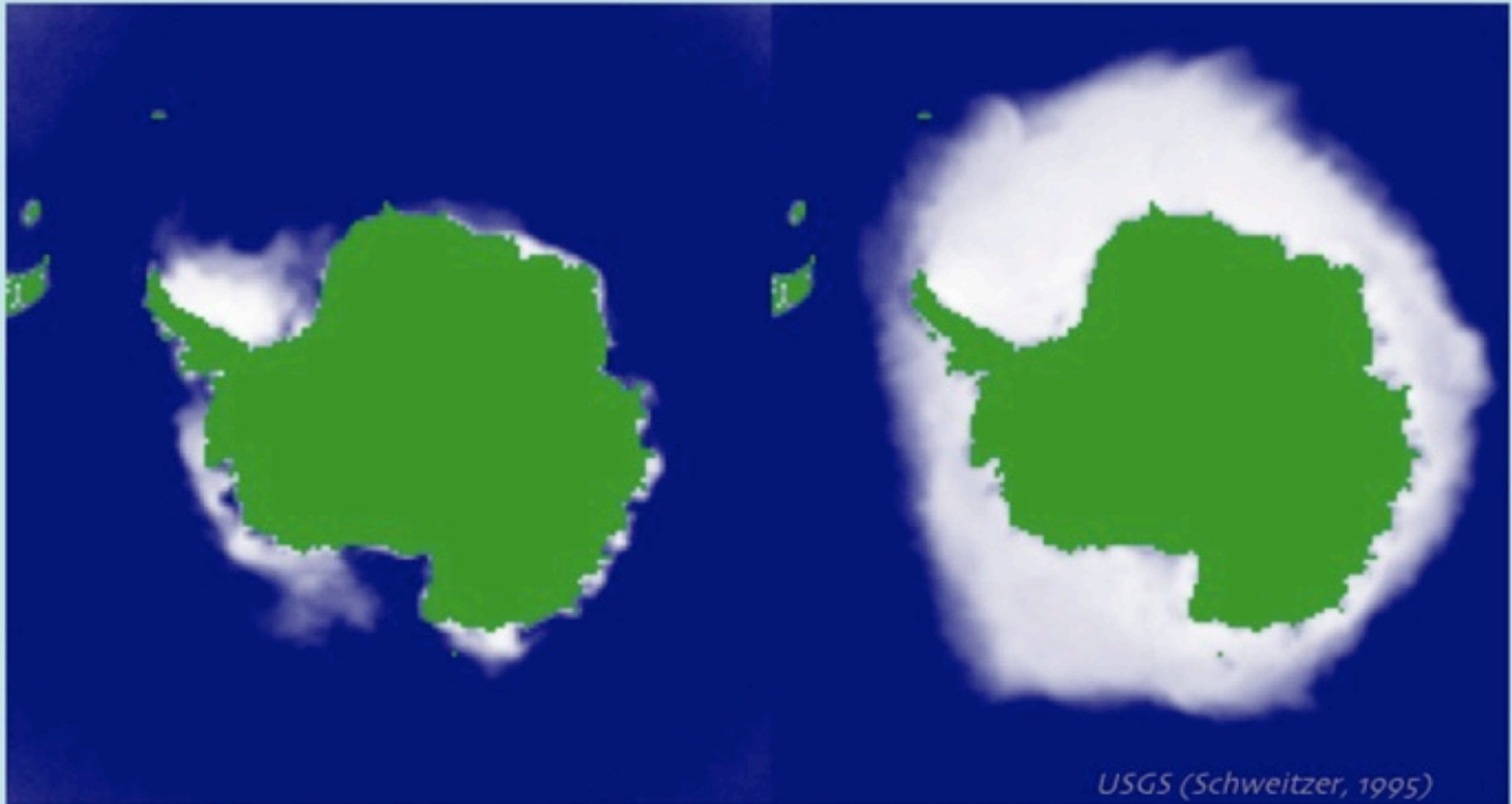
McMurdo Station



- PENINSULA STATIONS**
- 10 King Sejong (Rep of Korea)
  - 11 Marambio (Argentina)
  - 12 Palmer (USA)
  - 13 Presidente Eduardo Frei (Chile)
  - 14 Rothera (UK)
  - 15 San Martín (Argentina)
  - 16 Vernadsky (Ukraine)
  - 17 Escudero (Chile)

♦ Macquarie Island (Aus)

Seasonal sea ice is a dominant feature of the Southern Ocean

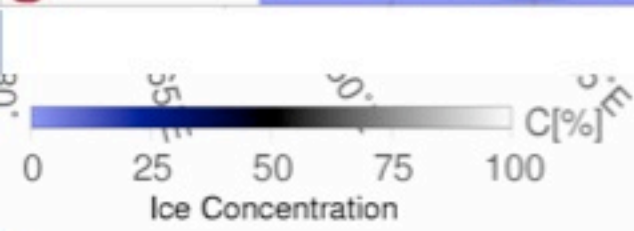
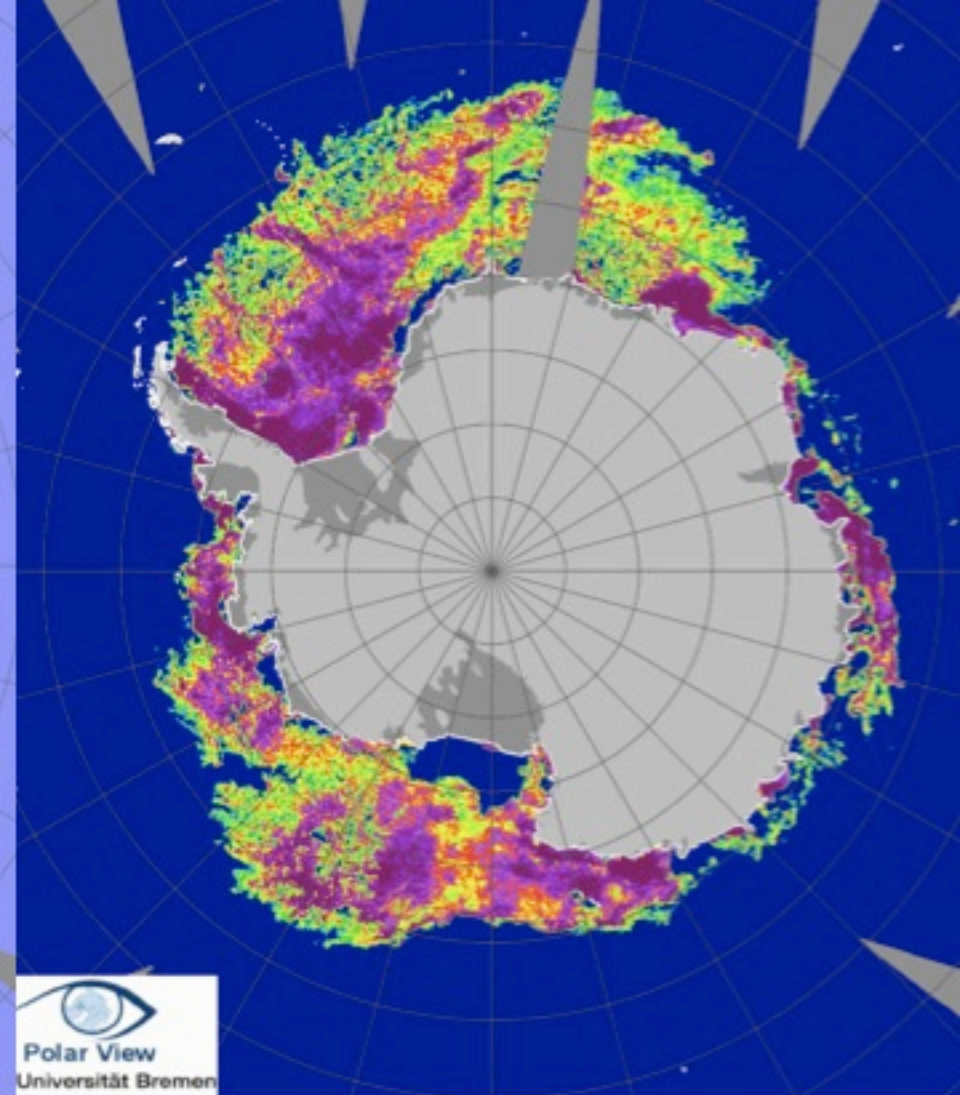
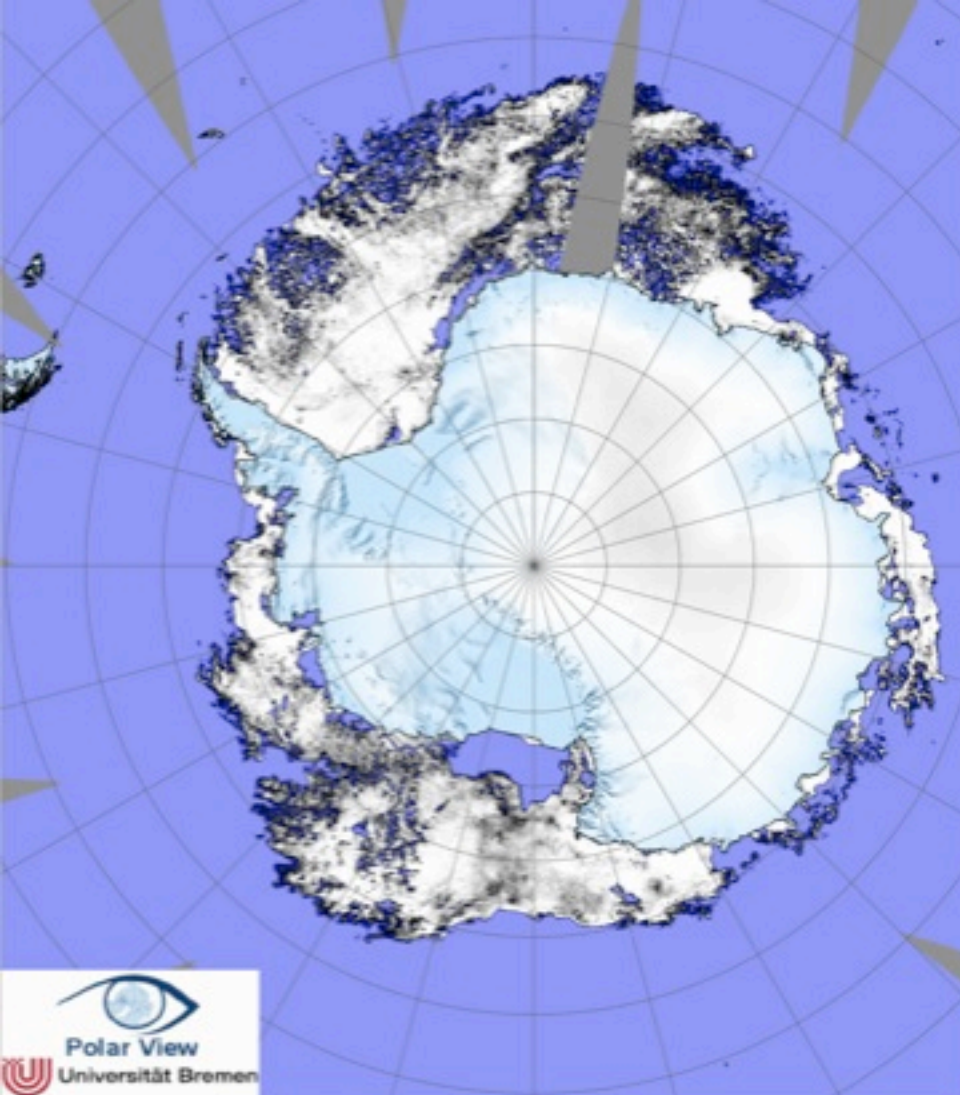


FEB

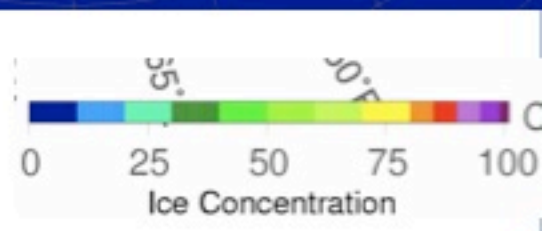
AUG

Monthly Average Polar Sea-Ice Concentration  
(1987-91; SSMR,SSM/I)



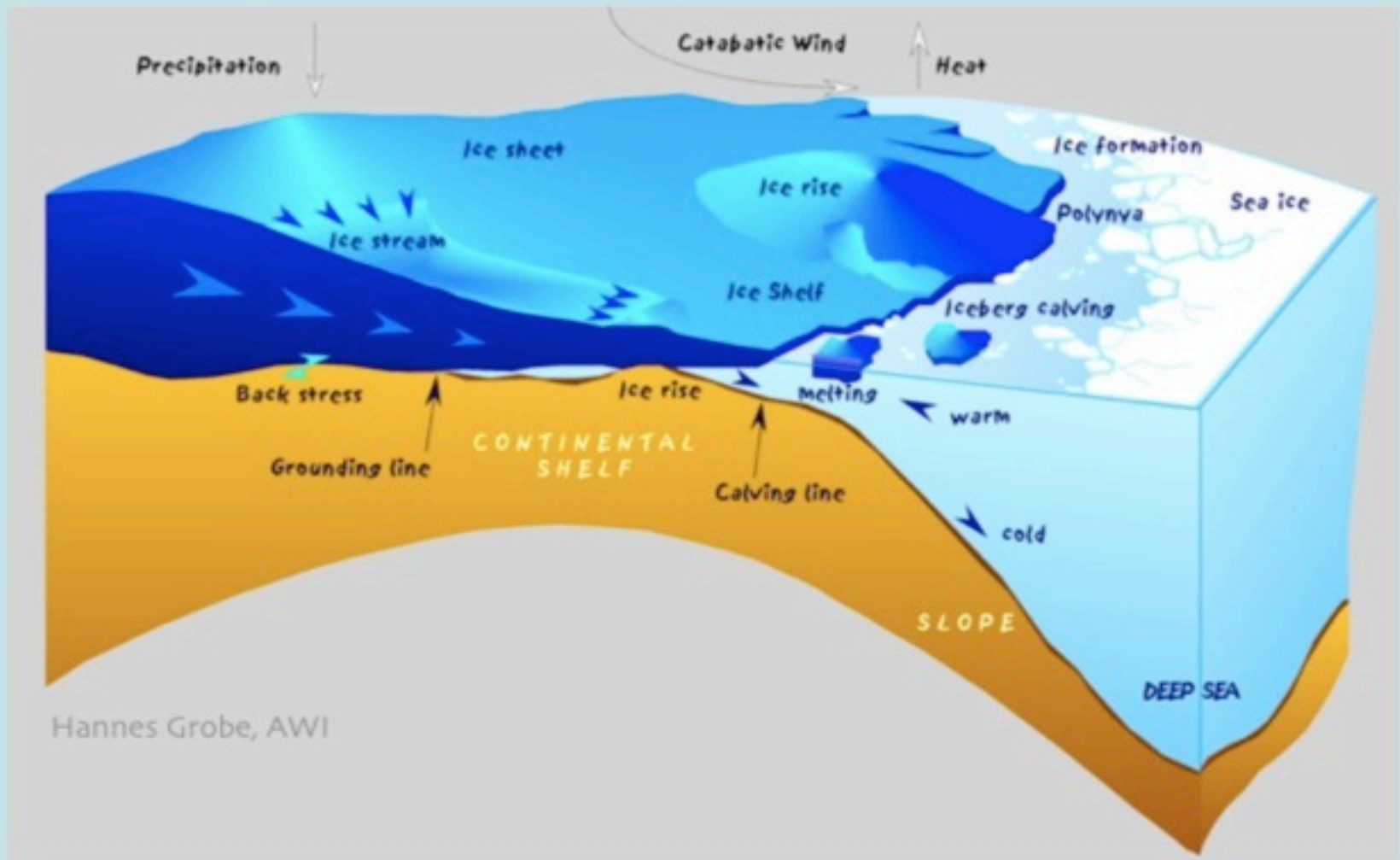


**14 December 2008**



Sea ice maps courtesy of Polar View: <http://iup.physik.uni-bremen.de:8084/amsr/amsre.html>

# Glaciers, Ice sheets, Ice shelves



The ice shelf - about 150 ft above the water line, 600 ft below





*Project Objective:*

Determine quantitative relationships among sea-ice properties, organohalogen production/degradation, CO<sub>2</sub> fixation/respiration, sea-ice microbiota composition, physiology, and activities.



Major science questions under this overarching goal include:

1. How does sea ice biology control gas concentrations in the ice?
2. What is the role of community composition and physiology?
5. How are community structure and gas flux related to the physical environment of the sea ice?



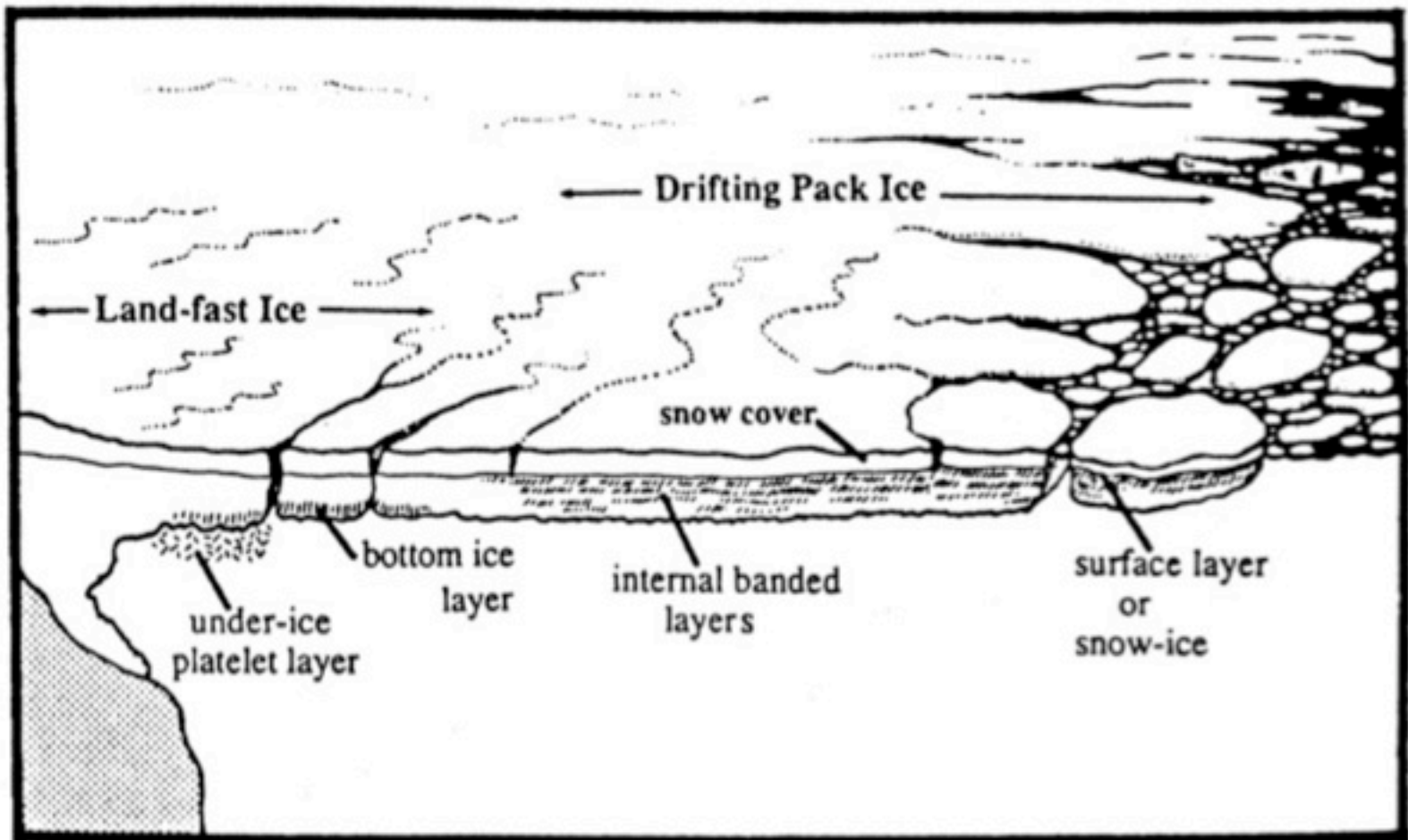
## Sea-ice algal productivity

40-70 million metric tons (Tg) C yr<sup>-1</sup>


5% of total productivity of Southern Ocean

Food source for higher trophics

Mediators of chemical transformations



Here's a figure from Garrison (1991), showing different habitats for sea ice microbial communities.



## *Organohalogens*

Compound name	Chemical formula
Iodomethane	$\text{CH}_3\text{I}$
Trichloromethane	$\text{CHCl}_3$
Tetrachloromethane	$\text{CCl}_4$
1,1,1-trichloroethane	$\text{CH}_3\text{CCl}_3$
Trichloroethene	$\text{CHCl}=\text{CCl}_2$
Dibromomethane	$\text{CH}_2\text{Br}_2$
Bromodichloromethane	$\text{CHCl}_2\text{Br}$
Chloriodomethane	$\text{CH}_2\text{ClI}$
2-Iodobuthane	$\text{CH}_3\text{CHICH}_2\text{CH}_3$
Tetrachloroethene	$\text{CCl}_2=\text{CCl}_2$
Dibromochloromethane	$\text{CHClBr}_2$
1-Iodobuthane	$\text{CH}_2\text{ICH}_2\text{CH}_2\text{CH}_3$
2-Iodopropane	$\text{CH}_3\text{CHICH}_3$
Tribrommethane	$\text{CHBr}_3$

Abrahamsson et al., 2004





## *Sea Ice Changes:*

*Amundsens/Bellinshausen*

-7% per decade

*Ross Sea sector:*

+5% per decade

*Consequences?*

- Ice biota
- Climate active gases
- Feedbacks



*Sampling ice from Oden*

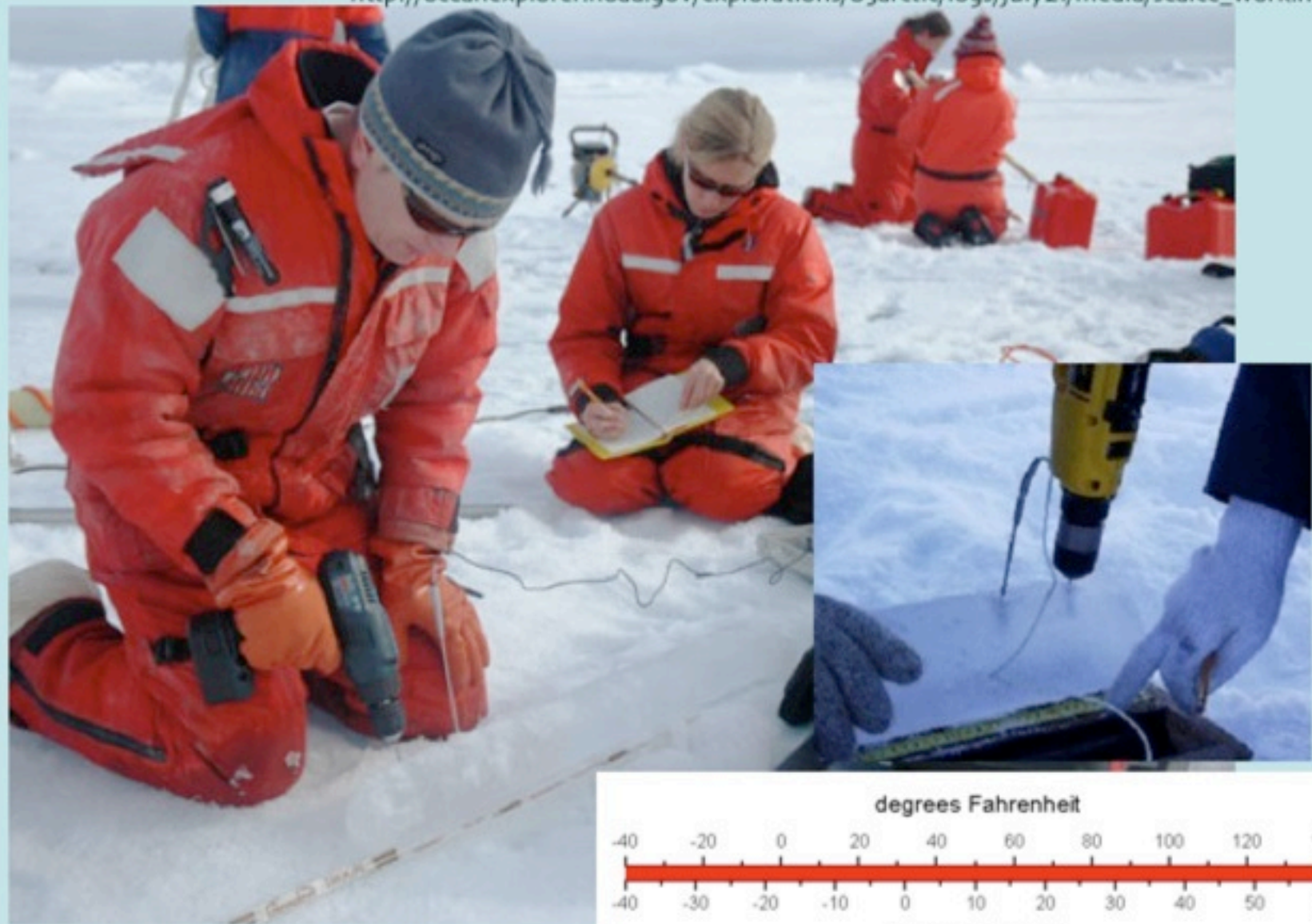
We will use a Kovacs Ice Drill  
to collect 14-cm diameter  
ice cores



<http://www.kovacsicedrillingequipment.com/photogallery.html>



**KOVACS  
ENTERPRISES**  
ICE DRILLING AND CORING EQUIPMENT



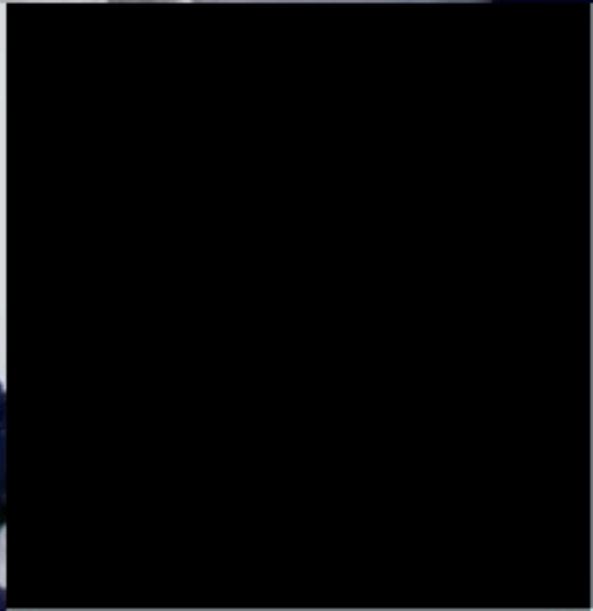
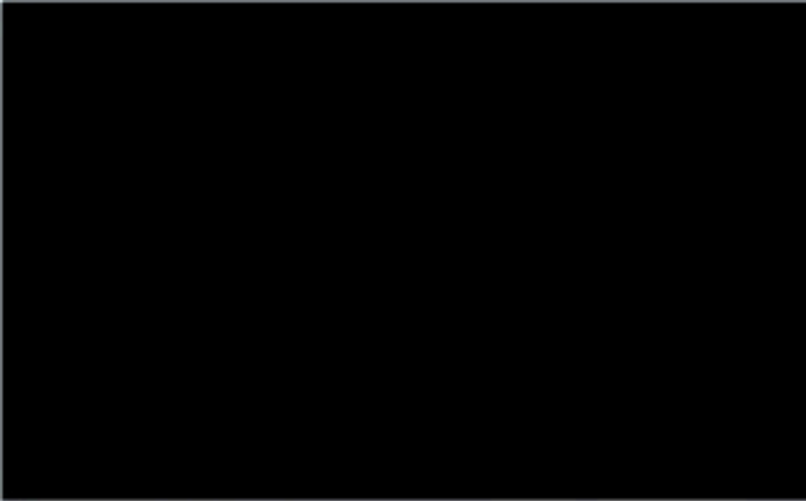
We will photograph and describe the core,  
and then take its temperature



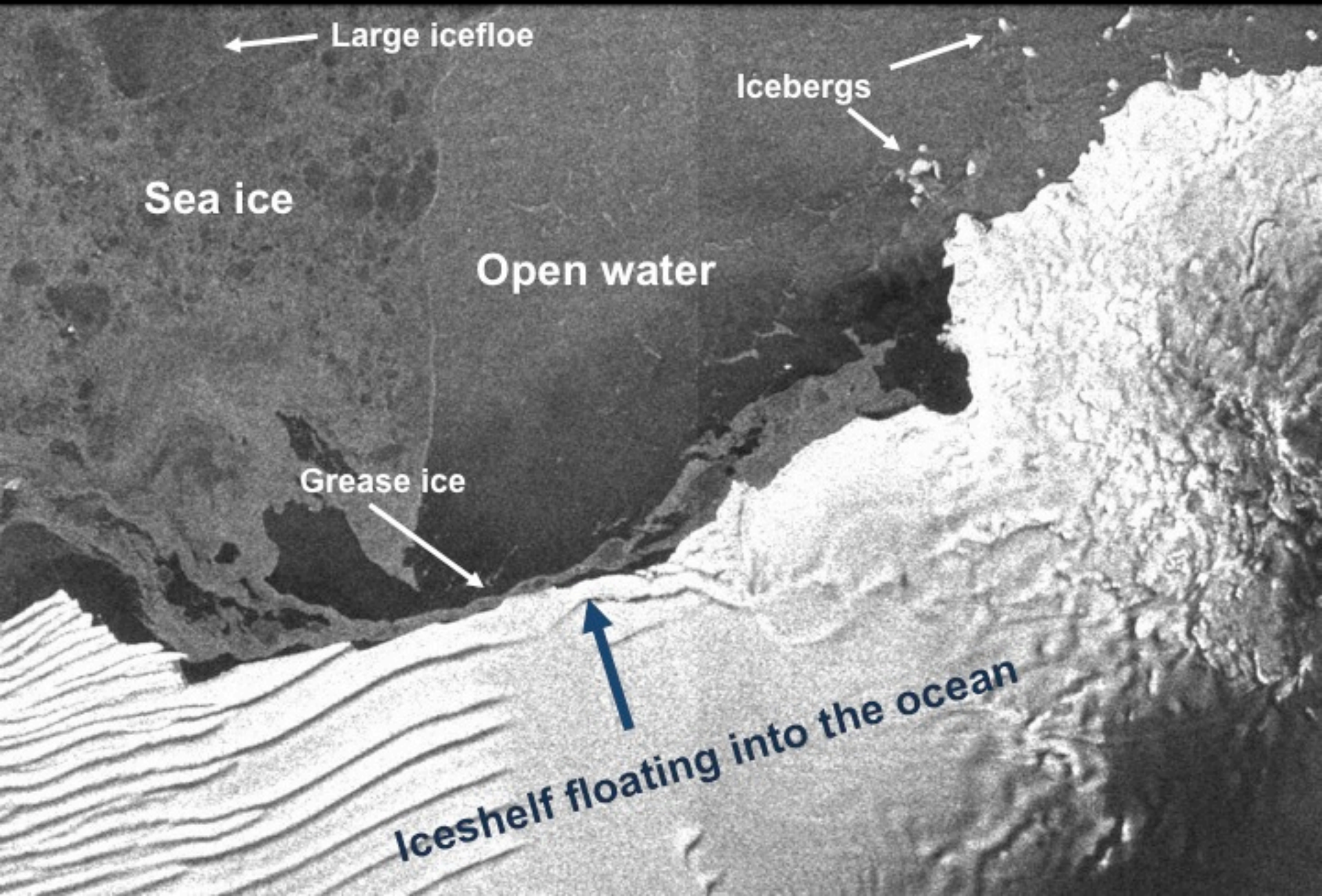
Lots of little bottles

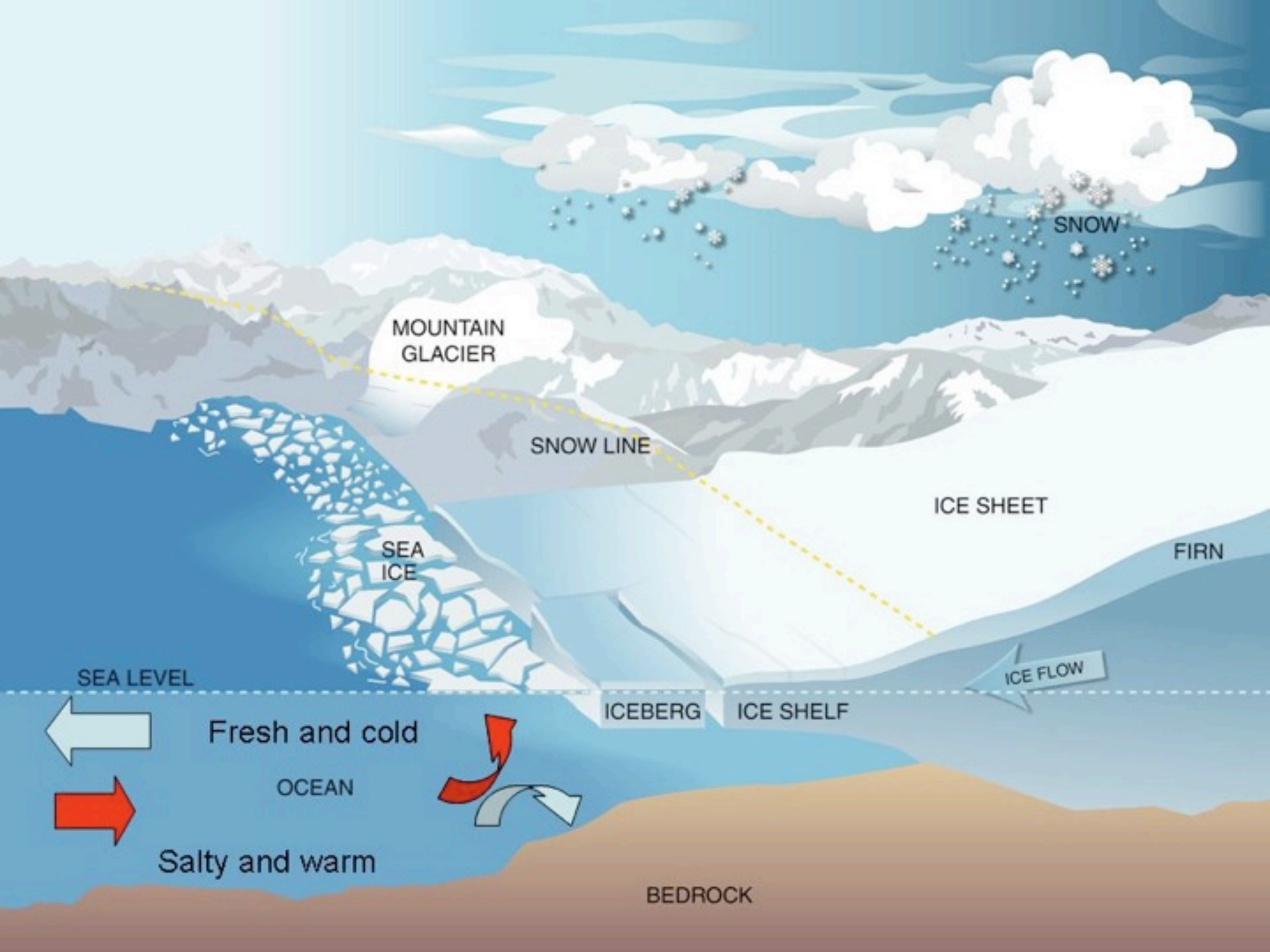


Lollie Garay



*Circulation of Warm Oceanic Water and Glacier Melt Water  
in the Amundsen Sea Shelf Region*





SNOW

MOUNTAIN  
GLACIER

SNOW LINE

ICE SHEET

FIRN

SEA  
ICE

SEA LEVEL

ICEBERG

ICE SHELF

ICE FLOW

Fresh and cold

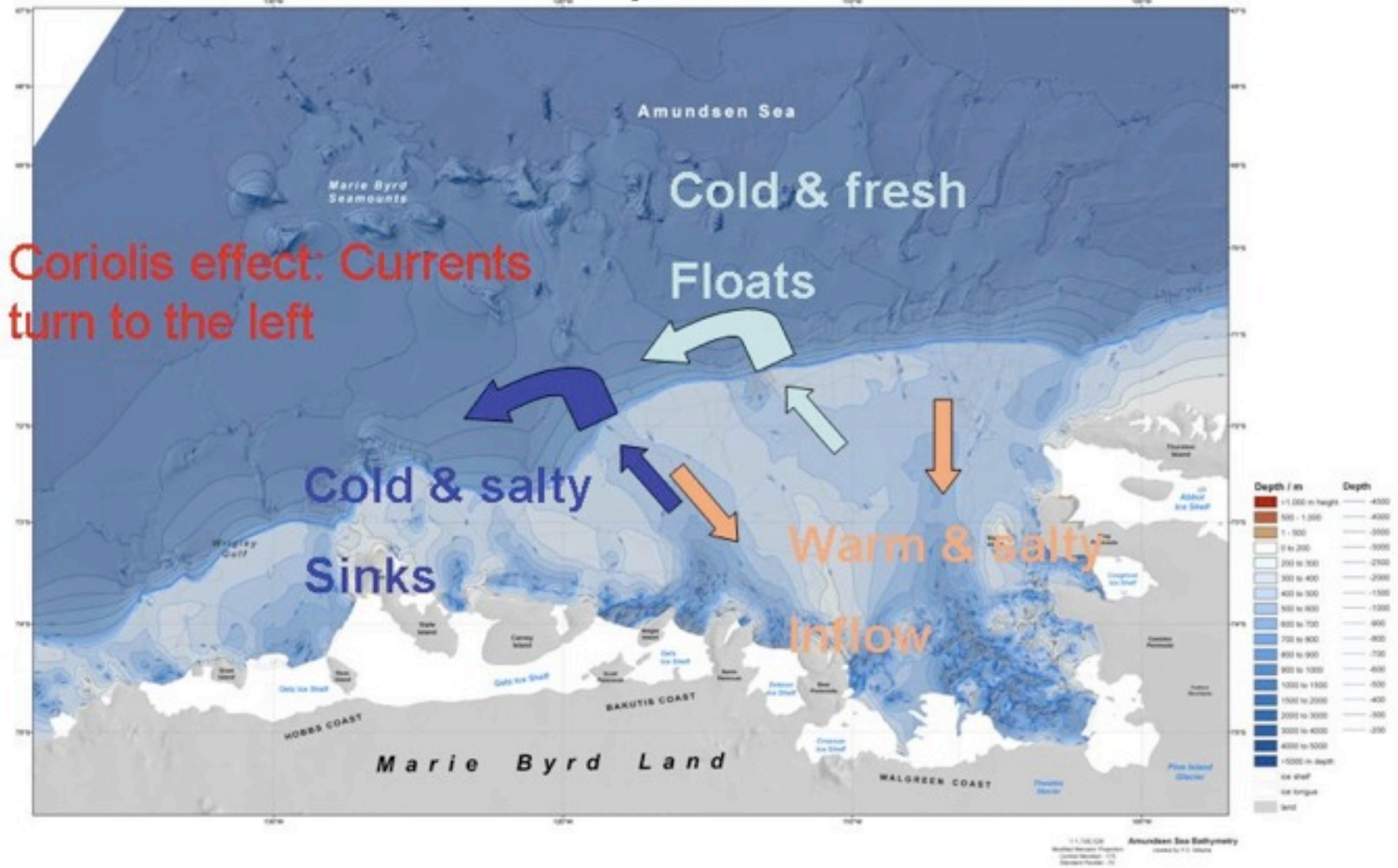
OCEAN

Salty and warm

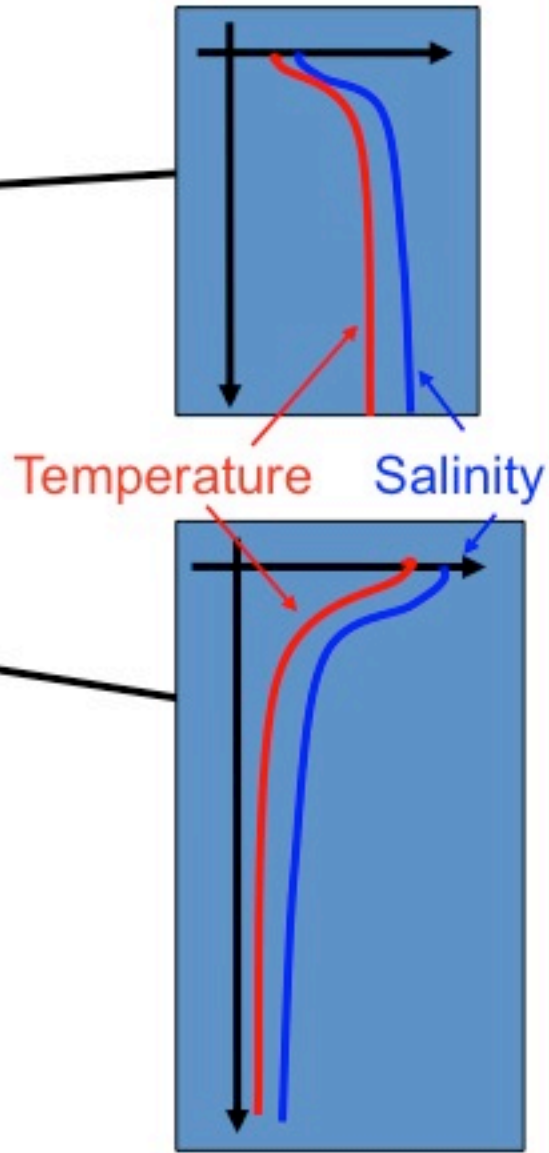
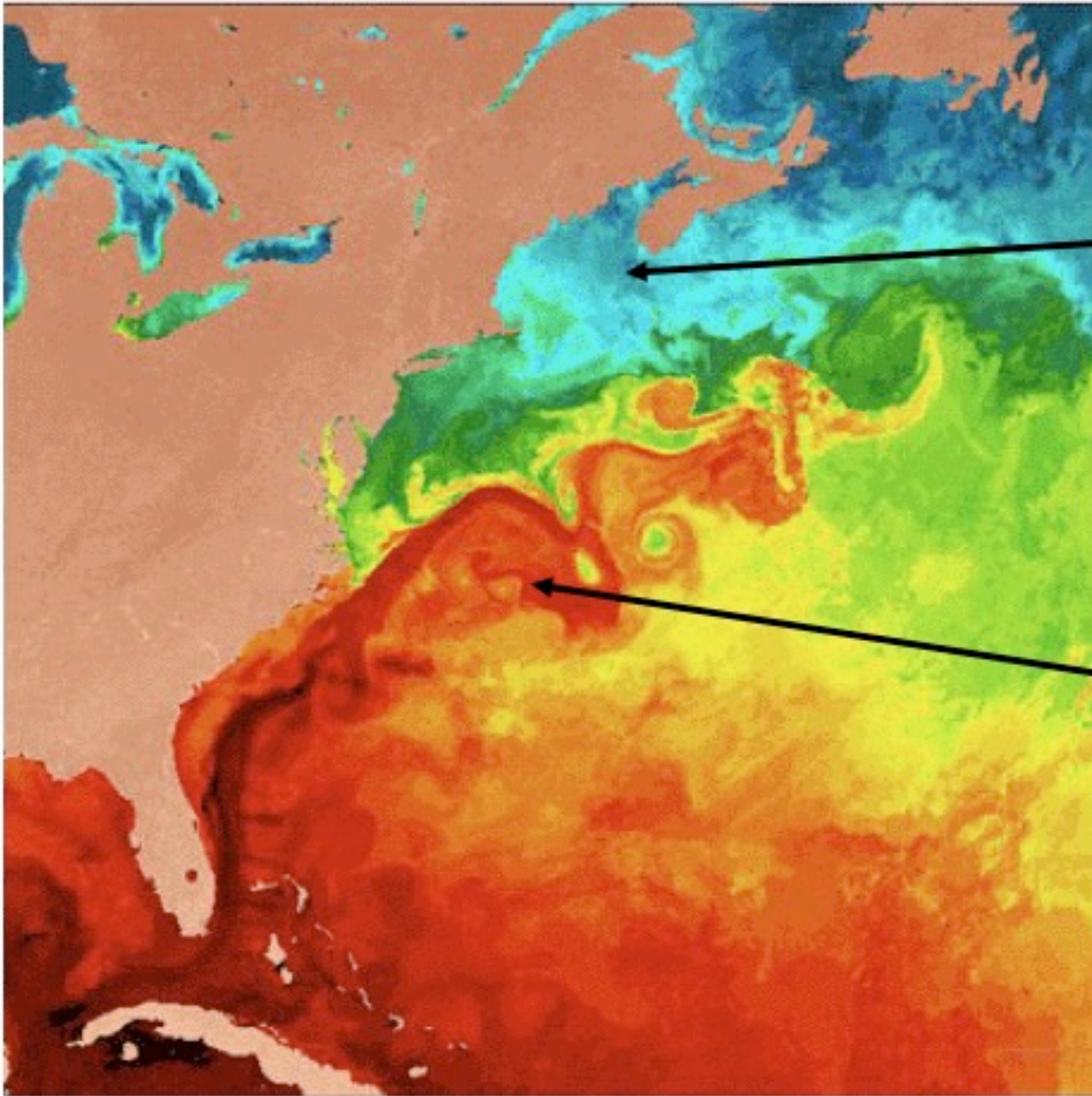
BEDROCK



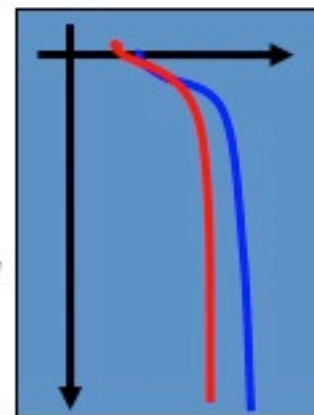
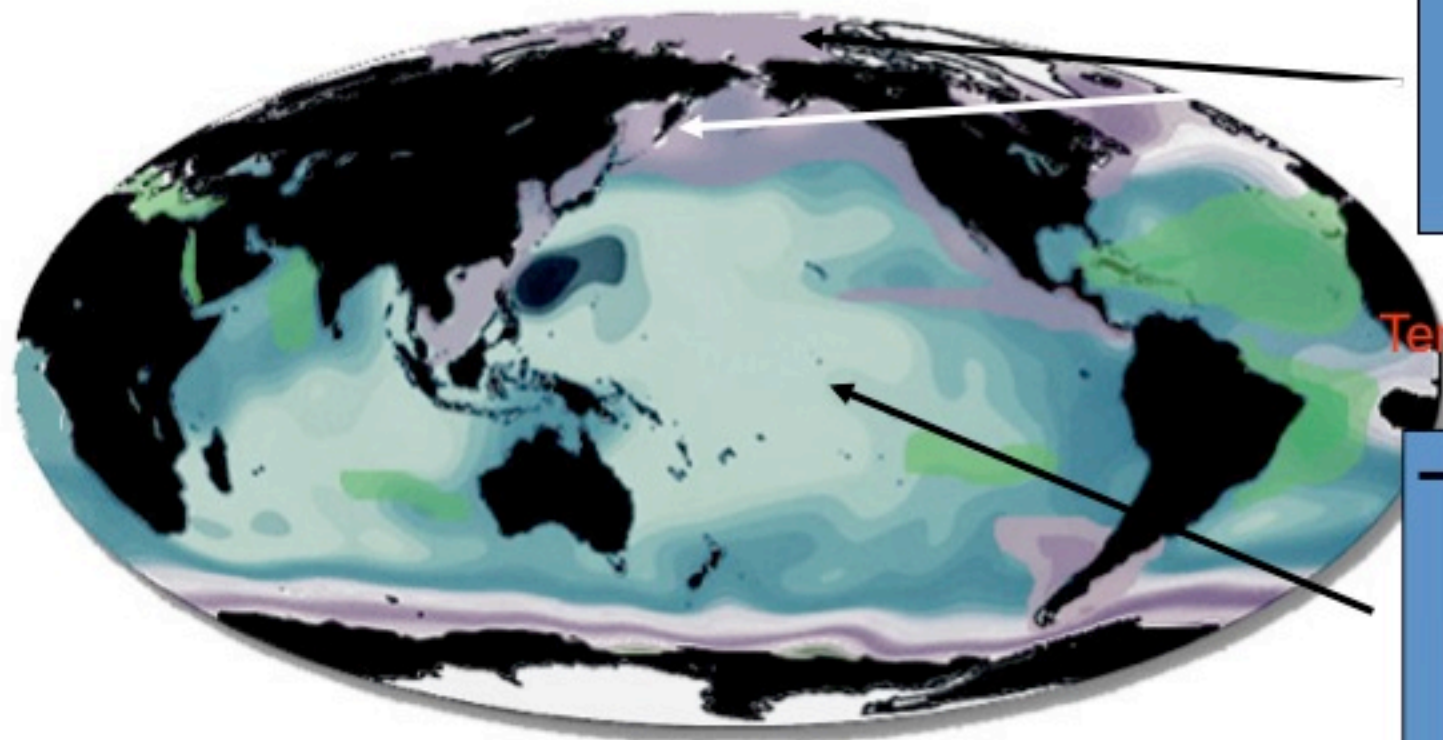
# Top view:



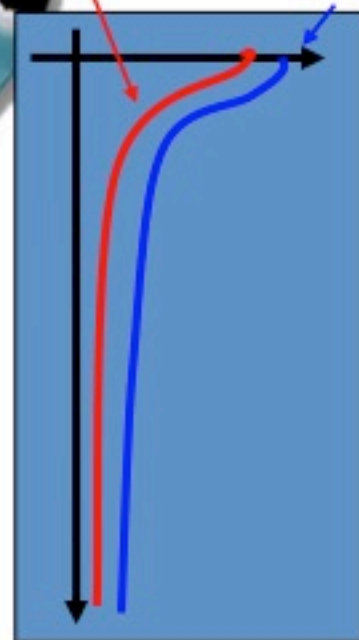
# Sea Surface Temperature from Satellite



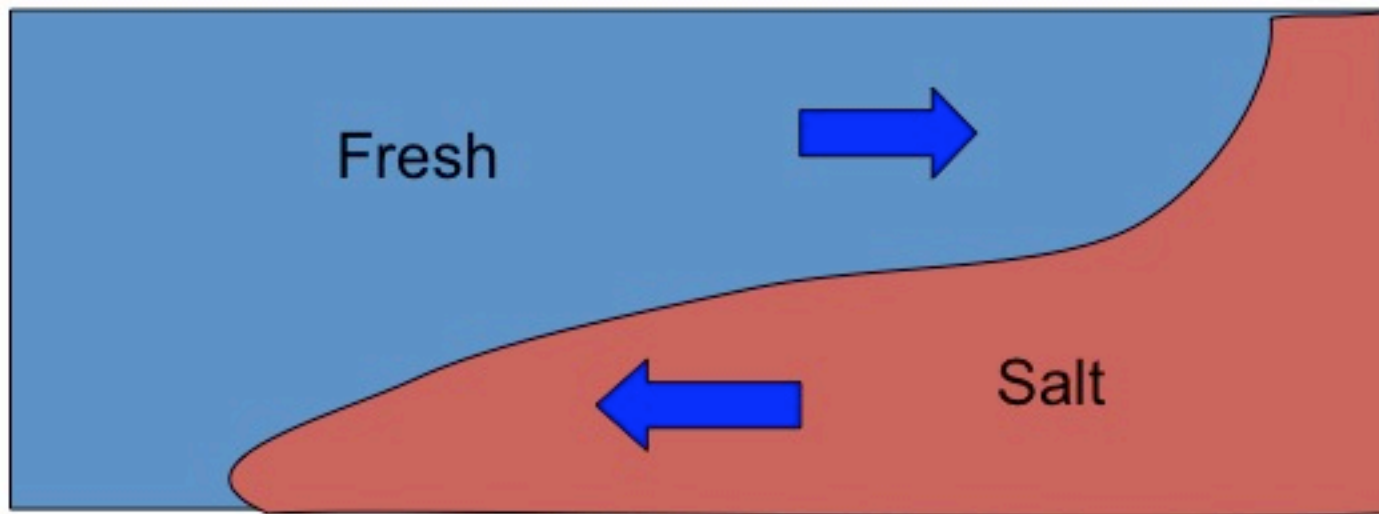
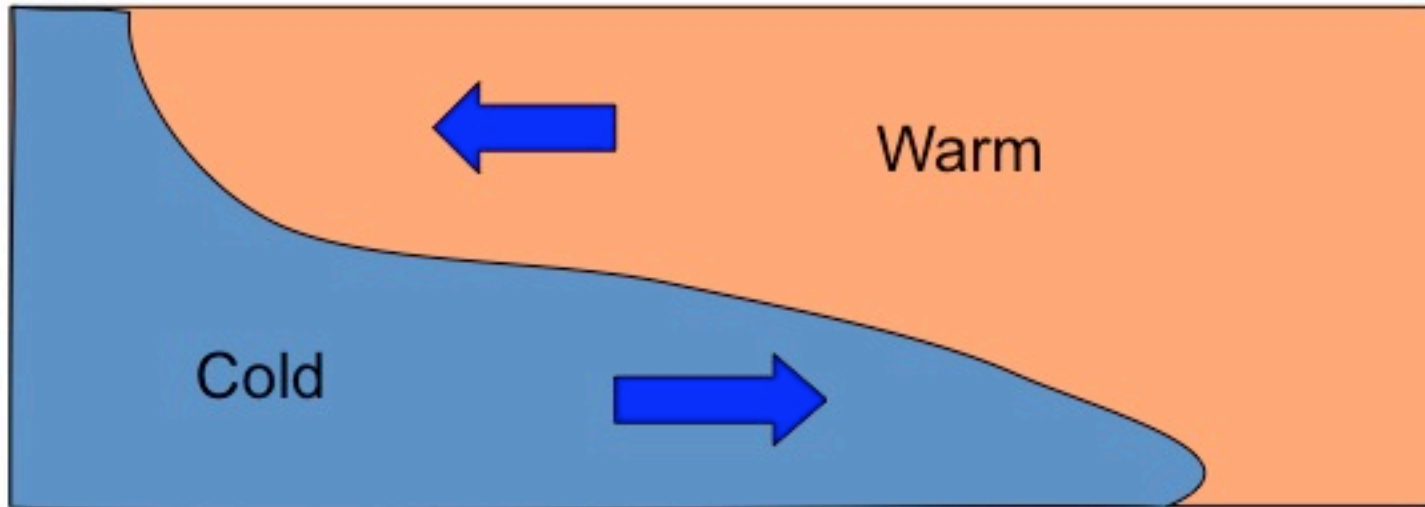
# Surface Salinity:



Temperature  
Salinity

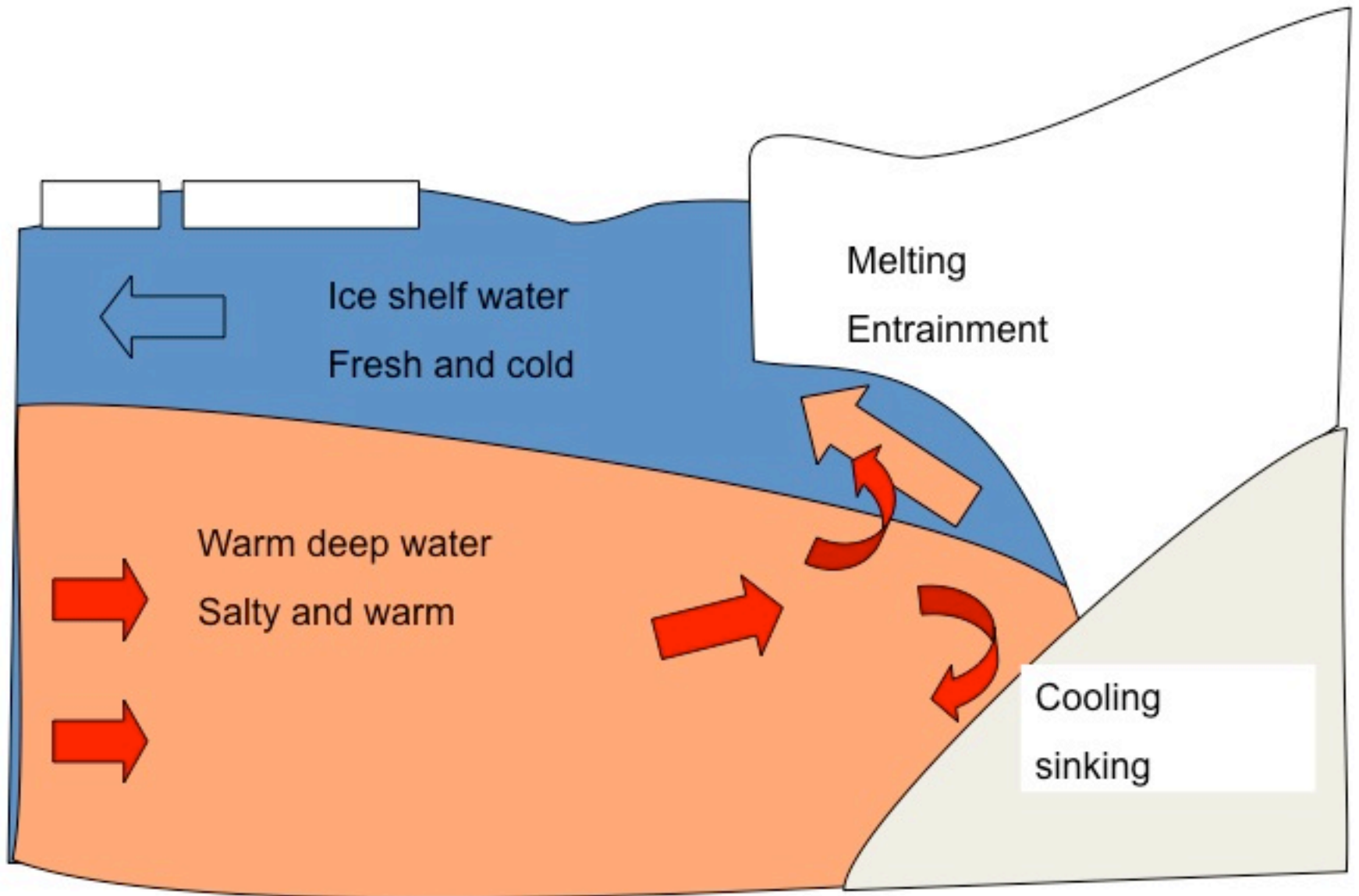


Warm water is lighter than cold water.



Fresh water is lighter than salt water.

# General Circulation



# Crabeater Seal Research





**CTD Recorder**  
Conductivity  
Temperature  
Depth



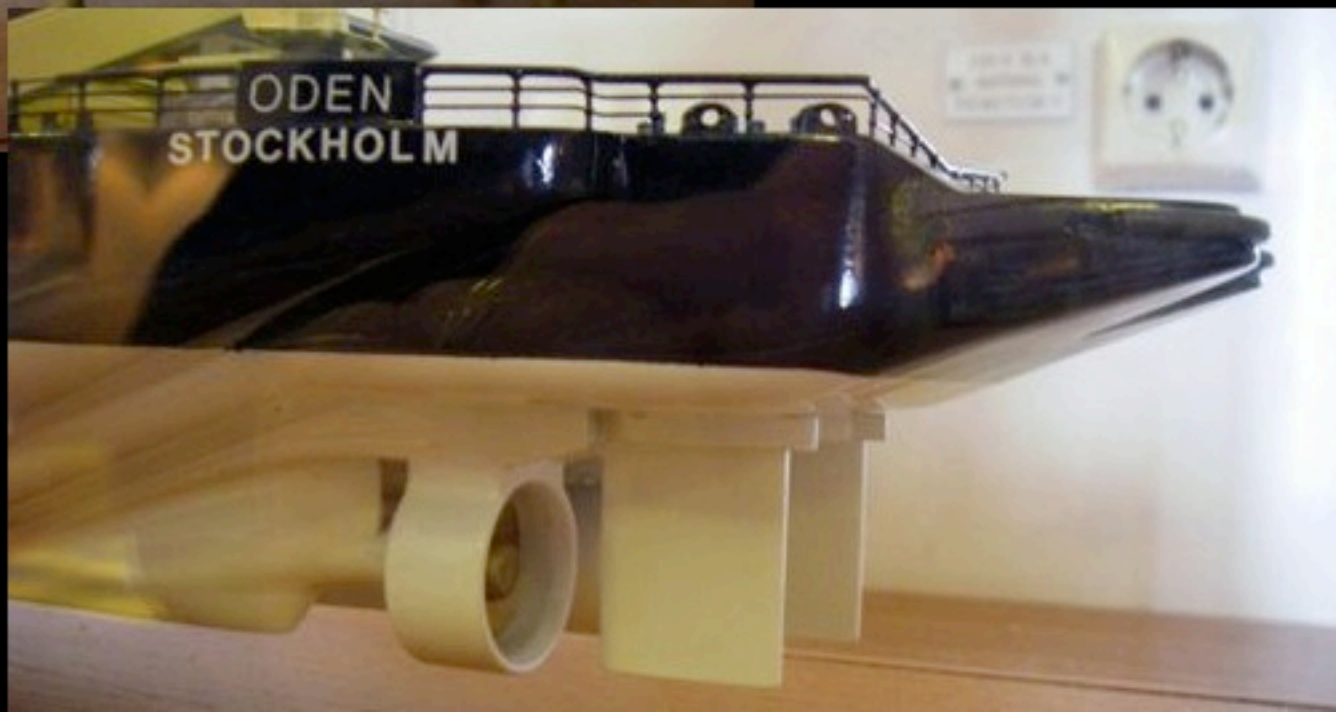
# Swedish Icebreaker *Oden*





- Builder: Götaverken, Arendal, Sweden - Delivered: 1988
- Length over all: 107.8 m
- Beam extreme: 31.0 m
- Depth to upper deck: 12.0 m
- Icebreaking capability: 1.9 m level ice at 3 knots
- Speed in open water: 16 knots
- Propulsion: 4 medium speed 8-cylinder diesel engines



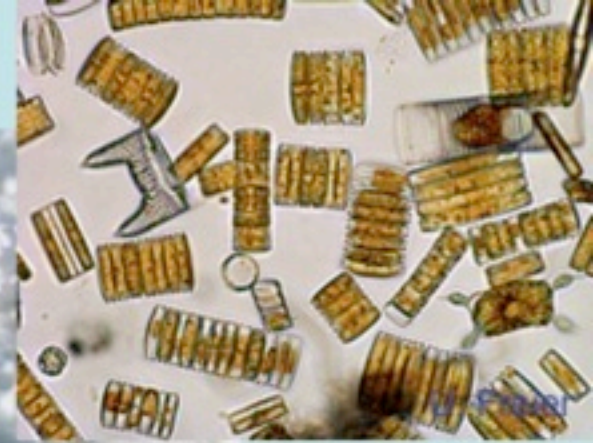




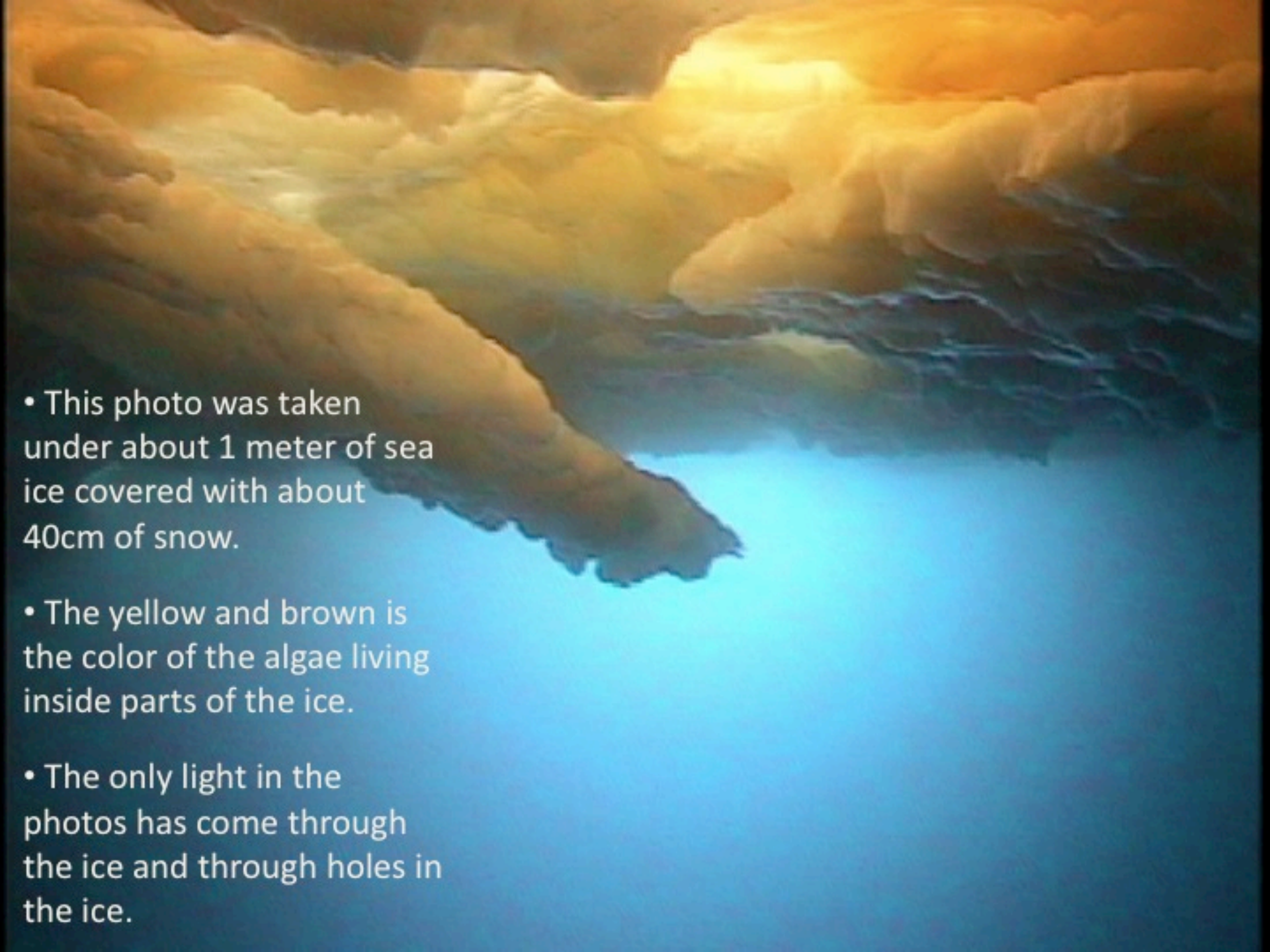
A powerful icebreaker - shaped like the belly of a whale







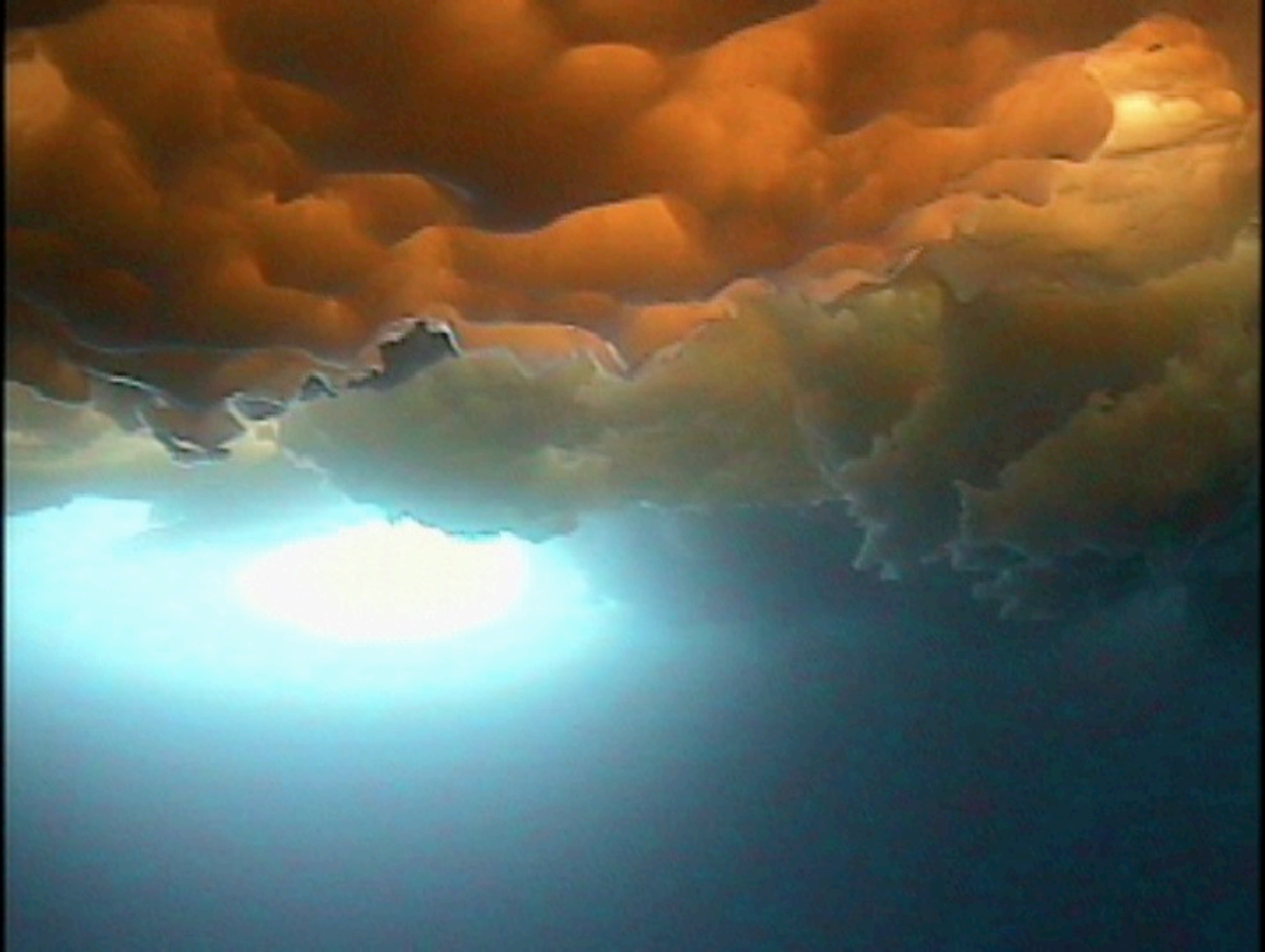
Sea ice algae is at the base of the food chain here



- This photo was taken under about 1 meter of sea ice covered with about 40cm of snow.

- The yellow and brown is the color of the algae living inside parts of the ice.

- The only light in the photos has come through the ice and through holes in the ice.





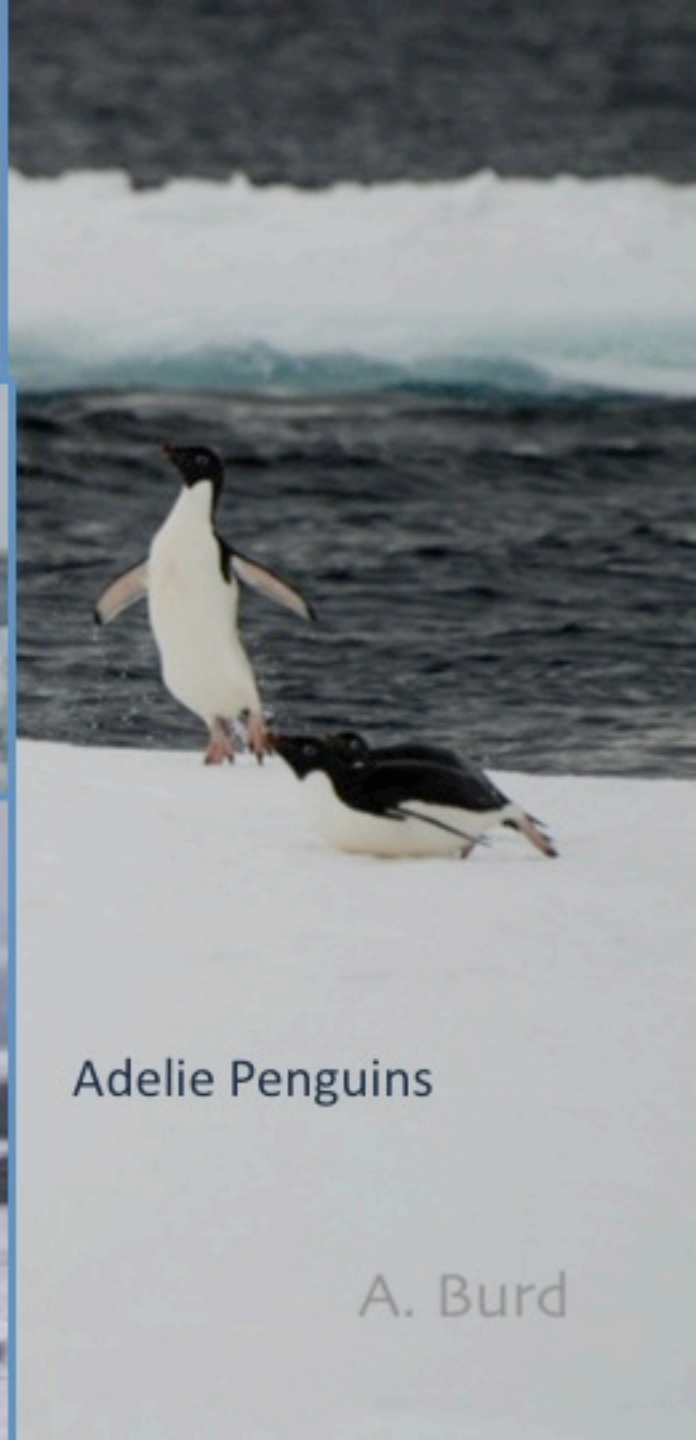
Weddell Seal



Orca Whales



Crabeater Seal



Adelie Penguins

A. Burd

# Questions

When asking a question, speak slow, loud, and clear and state your:

- **First Name**
- **Grade**
- **School**
- **Question**



Watch for Upcoming Events from Antarctica at :  
[www.polartrec.com](http://www.polartrec.com)!

# Thank You!



*If you have further questions,  
please contact us at:  
info@polartrec.com or call  
1-907-474-1600*

*The archive of this event  
will be available shortly at:  
www.polartrec.com!*





Antarctic Digital Coastline: Antarctic Digital Database, 2000  
US Digital Outline: ESRI