

ISIP Federation Meeting
**SEAICEBOX: Exploring Sea Ice in
the Arctic and Antarctic Regions**
Dr. Annette Schloss, UNH



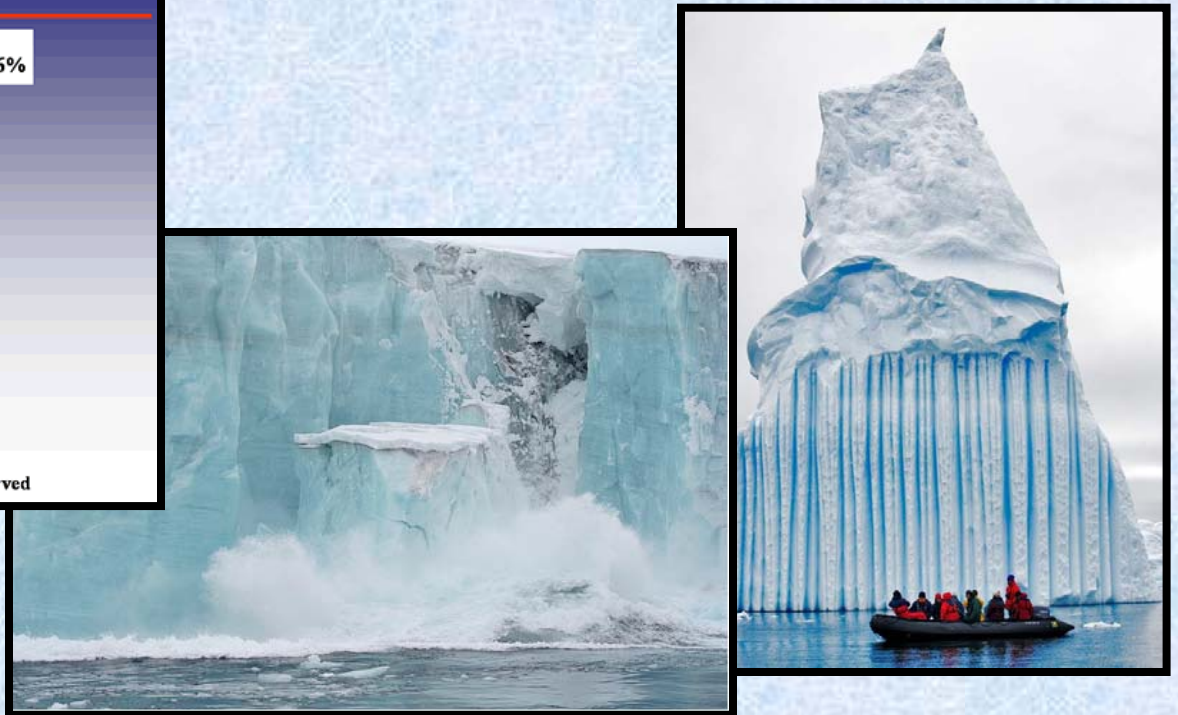
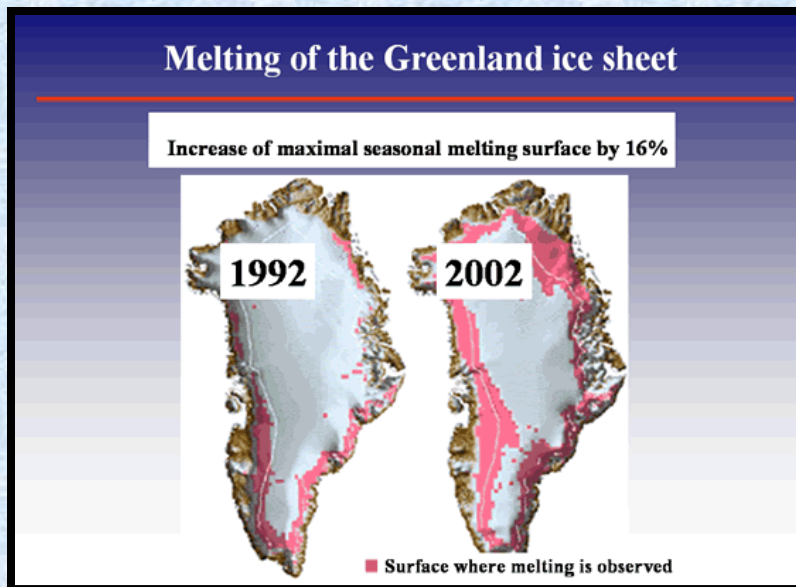
Icy Difference from Sea to Land

1. Sea ice forms, grows and melts in the ocean. Some remains all year round, and in the Arctic is greatest in March, and in the Antarctic is greatest in September.
2. Melting sea ice does NOT affect sea level.



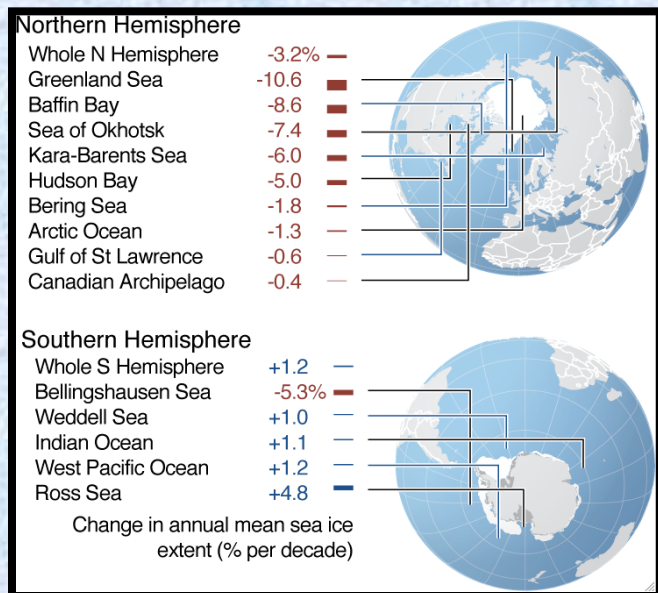
Icy Difference from Sea to Land

1. Other ice forms on land as glaciers, as ice shelves hanging over the ocean but which are held in place by sea ice plugs, and ice sheets which are glaciers $>50,000 \text{ km}^2$.
2. If these melt into the ocean they DO cause the sea level to rise.



The Importance of Sea Ice

1. Albedo is the reflection of light back into space off of surfaces. Snow covered ice, being white, has a high albedo and reflects more light; and thus helps to keep the polar regions cool, helping to stabilize our climate.
2. As saltwater freezes, salt is removed into the surrounding water, making it denser. Floating ice creates a barrier that prevents heat from escaping into the atmosphere, also helping to control climate.
3. Over the last 30 years both the thickness and the extent of Arctic sea ice has decreased, while the Antarctic is about the same.
4. Sites to learn more about sea ice: http://nsidc.org/arcticseaicenews/2008_faq.html
<http://www.ldeo.columbia.edu/~louisab/sedpage/basics.html>

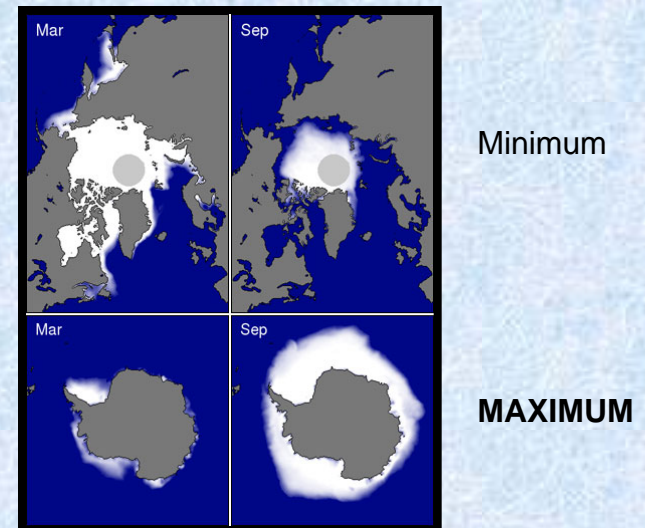


Arctic Sea Ice:

MAXIMUM

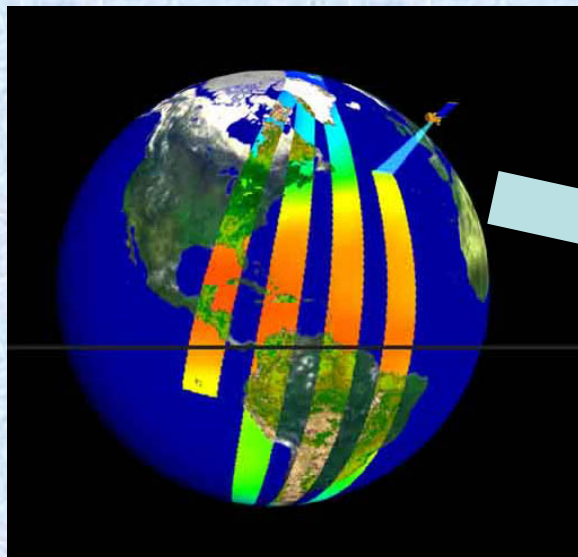
Antarctic Sea Ice:

Minimum

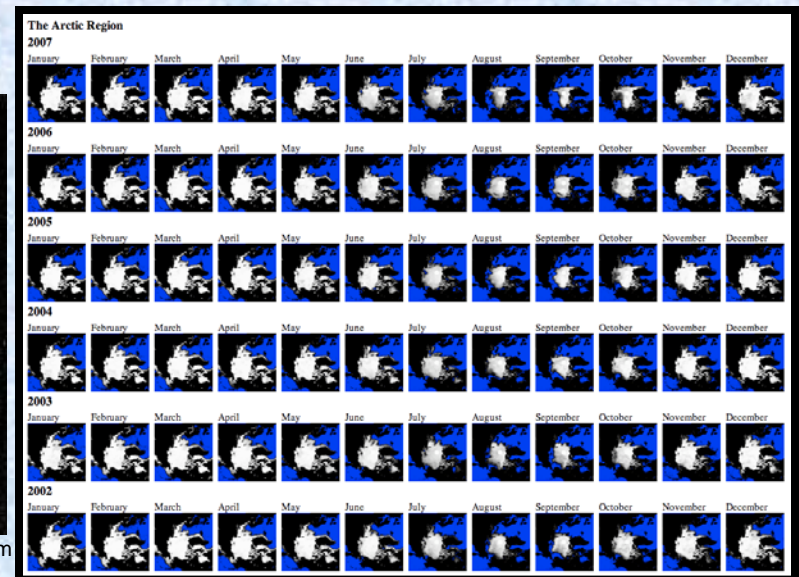


How do we study Sea Ice? Satellite Images!

1. Where do the images come from? From the the DMSP SMMR and SSM/I Passive Microwave Satellites. Microwaves can “see” the ice through the clouds, as well as during the 24 hour night during the winter at the poles. But it doesn’t go directly over the north pole.
2. How big is each Image Pixel? Each pixel is 25x25 km.
3. How often are images collected? Images are collected daily, but the National Snow and Ice Data Center verifies, processes and releases monthly averages once a year. That’s why you can see today’s image but you cannot currently access any monthly data averages from 2008/2009.




The Comet Program



What You Will See When You Open SEAICEBOX?

<http://iceplanetearth.org/seaicebox/index.jsp>

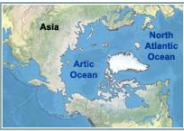
1st this ↓ where you will select either the Arctic or Antarctic Data Sets



Ice Planet Earth
In Celebration of the International Polar Year • 2007-2008


Welcome to SEAICEBOX

where you can see and compare monthly satellite images of sea ice in the Polar Regions.



The Arctic Ocean

In the northern polar region the Arctic Ocean is surrounded by land. Arctic sea ice is important in regulating the Earth's climate. Sea ice forms and melts with the polar seasons and some sea ice persists year after year.
[Arctic Sea Ice Exploration Begins Here](#)



The Continent of Antarctica


In the southern polar region the continent of Antarctica is surrounded by ocean. Most Antarctic sea ice is "seasonal ice," meaning it melts away and reforms annually, but ice also flows off the continent and forms large floating ice shelves along the coast.
[Antarctic Sea Ice Exploration Begins Here](#)

SEAICEBOX requires JAVA to run. [Click here to install JAVA](#)

Which opens this →


Learn About Sea Ice --> **SEAICEBOX** | First Time Users | Arctic Region | Antarctic Region | Browse Images

December 2007



December 2007 | Choose an Image

Date= December 2007



Percent Concentration

100%
51%
0%


Zoom & Roam
Restore
Probe

Plot transect
Distance
☒ Select region
Outline region

Histogram

Print Image

Hide Tutorial



How to Use SEAICEBOX

Zoom and Roam

When on, left mouse click to zoom in; right click to zoom out. Click and hold to drag a zoomed image. Restore zooms all the way out.

Probe

Press the Probe button and then pass your cursor over the large window. A readout will appear showing the unit value of each pixel.

Plot Transect/Distance

When on, these allow you to draw a line segment across any part of the scene in the large window and see a graph (plot transect) or distance of the line.

Select/outline region

When on, regions can be outlined and then plotted by clicking on the graphing buttons (histogram, scatter).

Step

Hitting the Step button will cycle through each of the three thumbnail images in the larger display window.

Animate/Stop

Toggle these buttons to animate the three thumbnail images in the larger display window.

[What is the hole in the middle?](#)

Learn About Sea Ice! Using SEAICEBOX you can:

See the latest daily image of sea ice concentration.
Compare up to 3 images of monthly sea ice starting in 1979.
Browse all images for the Arctic and Antarctic regions.

First time user?

What Can I Do With SEAICEBOX?

<http://iceplanetearth.org/seaicebox/index.jsp>

Select 1st image to analyze →


The color bar shows the % concentration of ice coverage in the image. Dark blue is water. White is the greatest concentration of ice. Black is land.

Note that you can Select any 3 images but it might be interesting to look for patterns like on the next slide.

Then select a 2nd Image
↓ which allows a 3rd selection.

Learn About Sea Ice --> SEAICEBOX | First Time Users | Arctic Region | Antarctic Region | Browse Images

December 2007



December 2007 | Choose an image

Zoom & Roam

Restore

Probe

Plot transect

Distance


Select region

Outline region

Histogram

Print Image

Hide Tutorial



Date= December 2007

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What Can I Do With SEAICEBOX?

You can repeat the same activities with the Antarctic images by clicking this link at the top of the window.↓

<http://iceplanetearth.org/seaicebox/index.jsp>

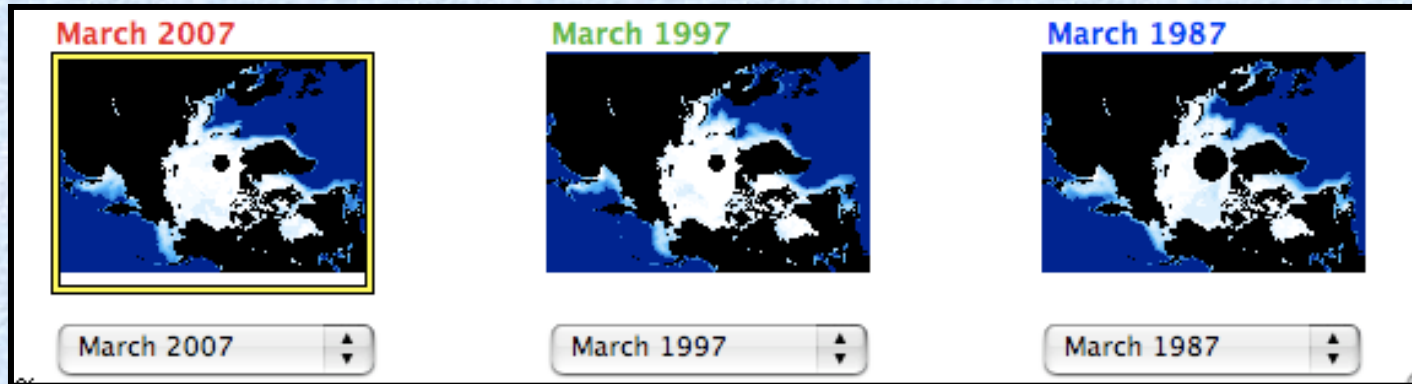


1. Test out the Zoom & Roam function to see individual pixels. Try the Step/Animate functions.
2. What are the red, green and blue Probe functions?
3. Trace a Transect on the image. Look at the tri-graph. It shows total Distance and % ice along the Transect.
4. The Select Region tool lets you select a rectangle box and the Outline Region any shape. Then use the Scatter or Histogram to visualize a tri-graph that will show the % concentration of ice for each year against the number of Pixels exhibiting that concentration on the y-axis.

Why is there a hole in the center of the image? Click here↑

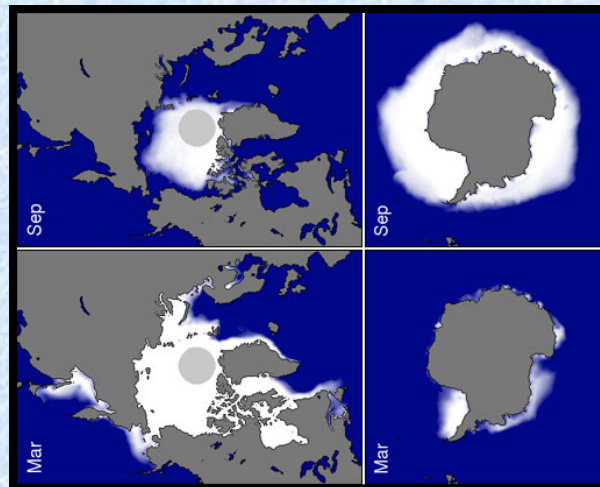
What Activities Can I Carry Out With My Students?

1. Study Change over time using the three images.



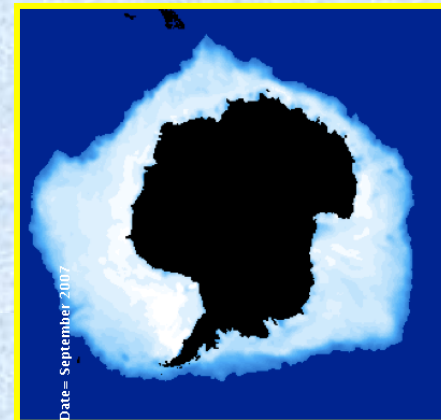
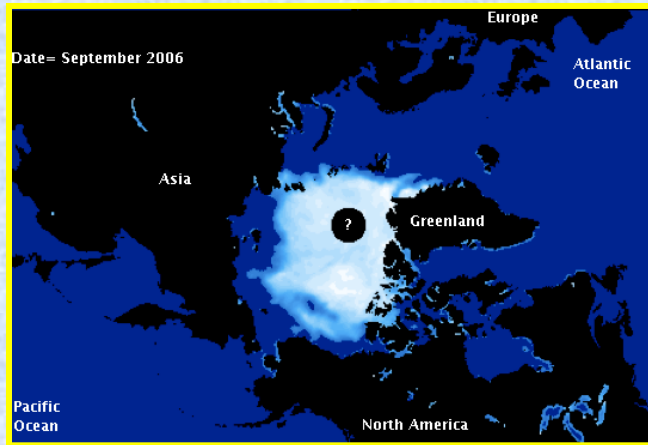
<http://iceplanetearth.org/seaicebox/index.jsp>

2. Demonstrate that the Arctic and Antarctic minimum/maximum are opposite.



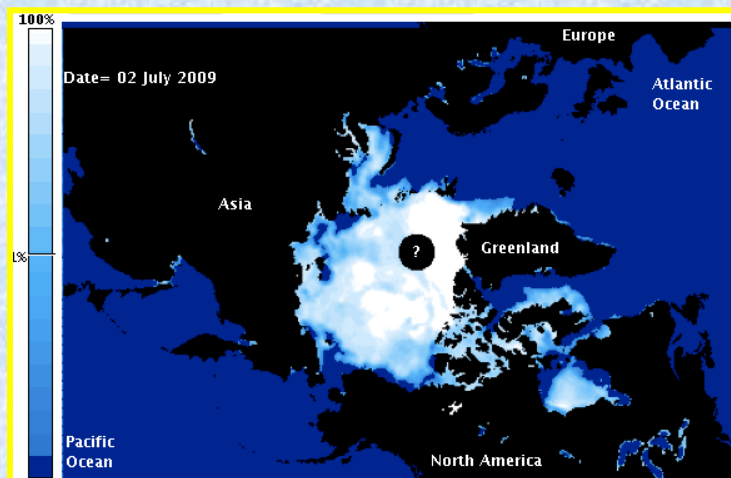
What Activities Can I Carry Out With My Students?

3. Demonstrate that the amount of ice in the Arctic is going down and the amount of ice in the Antarctic is not.



<http://iceplanetearth.org/seaicebox/index.jsp>

4. Interpret the latest image using the monthly news update from NSIDC.



<http://nsidc.org/arcticseaicenews/>

Ice Planet Earth

In Celebration of the International Polar Year • 2007-2008



References:

1. <http://lighthousepatriotjournal.files.wordpress.com/2008/06/iceburg-04.jpg>
2. http://farm1.static.flickr.com/68/184253655_a783320def.jpg
3. <http://www.sahfos.ac.uk/climate%20encyclopaedia/images/greenland-ice-sheet.gif>
4. <http://history.nasa.gov/SP-4312/p76.jpg>
5. <http://iceplanetearth.org/seaicebox/index.jsp>
6. <http://maps.grida.no/go/graphic/regional-changes-in-arctic-and-antarctic-sea-ice>
7. http://www.unep.org/geo/geo%5Fice/PDF/GEO_C5_LowRes.pdf
8. <http://iceplanetearth.org/resources.shtml>
9. <http://polardiscovery.who.edu/index.html>
10. <http://nsidc.org/arcticseaicenews/>

