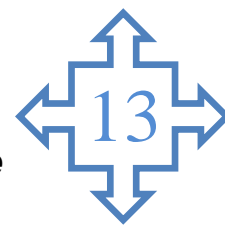
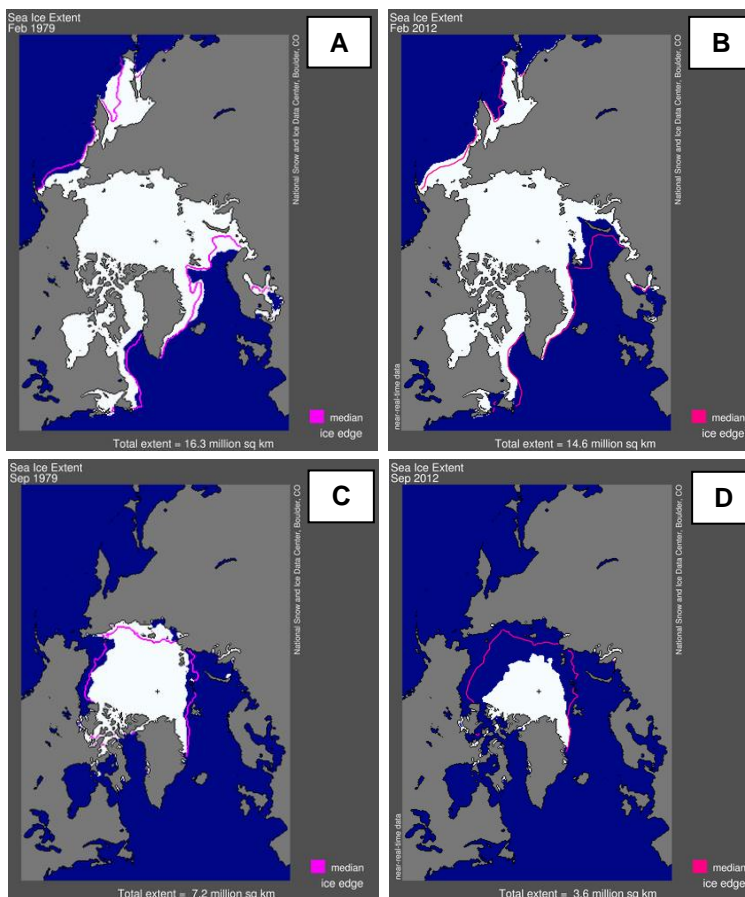


Thinking About Climate Change

Comparing Summer and Winter Arctic Sea Ice Area Over Time



Scientists from the National Snow and Ice Data Center have been collecting data on the extent of sea ice in the Arctic since 1978. The first set (A&B) of images is from February of 1979 and 2012. February is generally the month of maximum ice coverage. The pink line shows the median extent of ice for the month of February throughout the 30 year period of record. Notice where the ice (white) is located in relationship to the land (grey). The two images you see are extremes of ice coverage over the last 32 years. The second image set (C&D) are from September 1979 and 2012. These images represent ice cover surface area in the Arctic from the first year of collection to 2012.



1. How are the images similar and different?
 Ways in which images A and B are similar: _____

Ways in which images A and B are different: _____

Ways in which images C and D are similar: _____

Ways in which images C and D are different: _____

2. What is the difference in the extent of sea ice (area) from 1979 to 2012?
 February 1979 to February 2012: _____ sq. km
 September 1979 to September 2012: _____ sq. km

3. What percent loss does this represent?
 February 1979 to February 2012: _____ % loss
 September 1979 to September 2012: _____ % loss

4. Which season shows the most dramatic change? Explain your answer.

5. These images represent just the surface area of the existing sea ice. What other variables might be important to measure “the health” of the remaining sea ice?

Image source and additional sea ice animation: http://nsidc.org/data/seaice_index/archives/image_select.html

Thinking About Climate Change: Comparing Summer and Winter Arctic Sea Ice Area Over Time

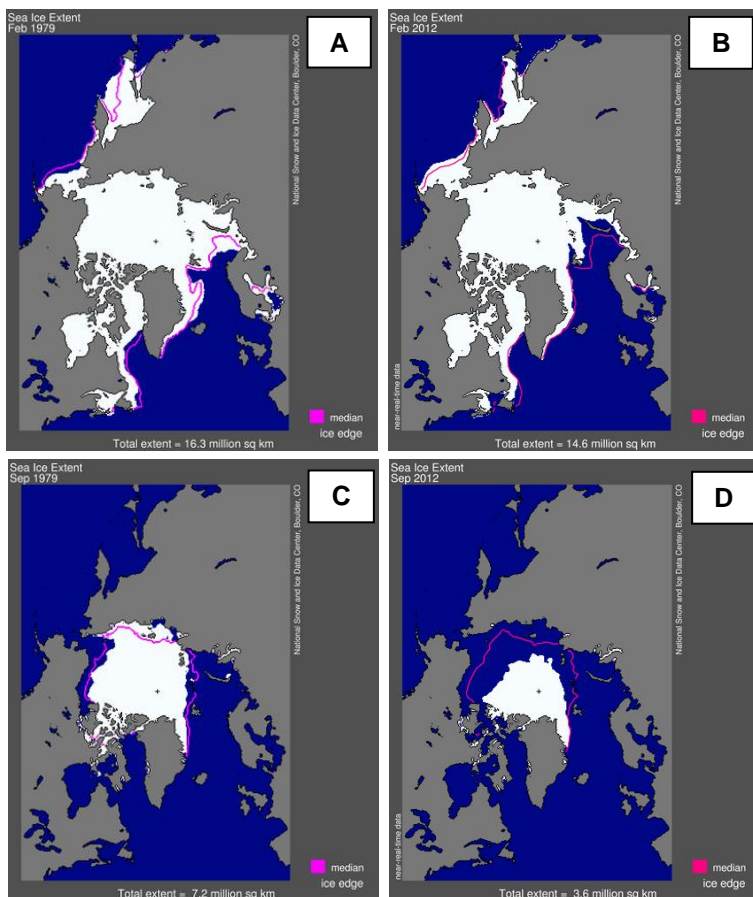


Thinking About Climate Change

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Scientists from the National Snow and Ice Data Center have been collecting data on the extent of sea ice in the Arctic since 1978. The first set (A&B) of images is from February of 1979 and 2012. February is generally the month of maximum ice coverage. The pink line shows the median extent of ice for the month of February throughout the 30 year period of record. Notice where the ice (white) is located in relationship to the land (grey). The two images you see are extremes of ice coverage over the last 32 years. The second image set (C&D) are from September 1979 and 2012. These images represent ice cover surface area in the Arctic from the first year of collection to 2012.



1. How are the images similar and different?

Ways in which images *A and B* are similar: **Most of the Arctic Ocean is still covered in sea ice; Greenland is mostly surrounded by sea ice.**

Ways in which images *A and B* are different: **There is less sea ice in 2012 than in 1979, especially along the northern coast of Russia in 2012; there is less sea ice near Norway/Sweden; there is more sea ice in the Bering Strait; there is less sea ice in the Sea of Okhotsk near the Kamchatka Peninsula (Russia).**

Ways in which images *C and D* are similar: **The North Pole is still covered in ice; the northern part of Greenland remains ice-bound; small bays in northern Canada and Russia are ice bound.**

Ways in which images *C and D* are different: **There is much less sea ice in 2012 than in 1979; the northeastern part of Russia was ice-bound in 1979 (summer) but there is no sea ice in this area in 2012; many of the islands of northern Canada were icebound in 1979, but waterways are free of ice in 2012.**

2. What is the difference in the extent of sea ice (area) from 1979 to 2012?

February 1979 to February 2012: $16.3 - 14.6 = 1.7$ million sq. km

September 1979 to September 2012: $7.2 - 4.9 = 2.3$ million sq. km

3. What percent loss does this represent? Calculate percent lost to the nearest whole number.

February 1979 to February 2012: **10%** loss

September 1979 to September 2012: **22%** loss

4. Which season shows the most dramatic change? Explain your answer.

Summer shows the most dramatic change. I can see the difference by looking at the amount of white (which represents ice). I also calculated the percent of loss between the two summer and two winter images. The percent loss of sea ice was 22% in the summer images and only 10%.

5. These images represent just the surface area of the existing sea ice. What other variables might be important to measure "the health" of the remaining sea ice?

Thickness, hardness, changes in ice conditions

Image source and additional sea ice animation: http://nsidc.org/data/seaice_index/archives/image_select.html