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## Arctic Sea Ice Melting and Moving

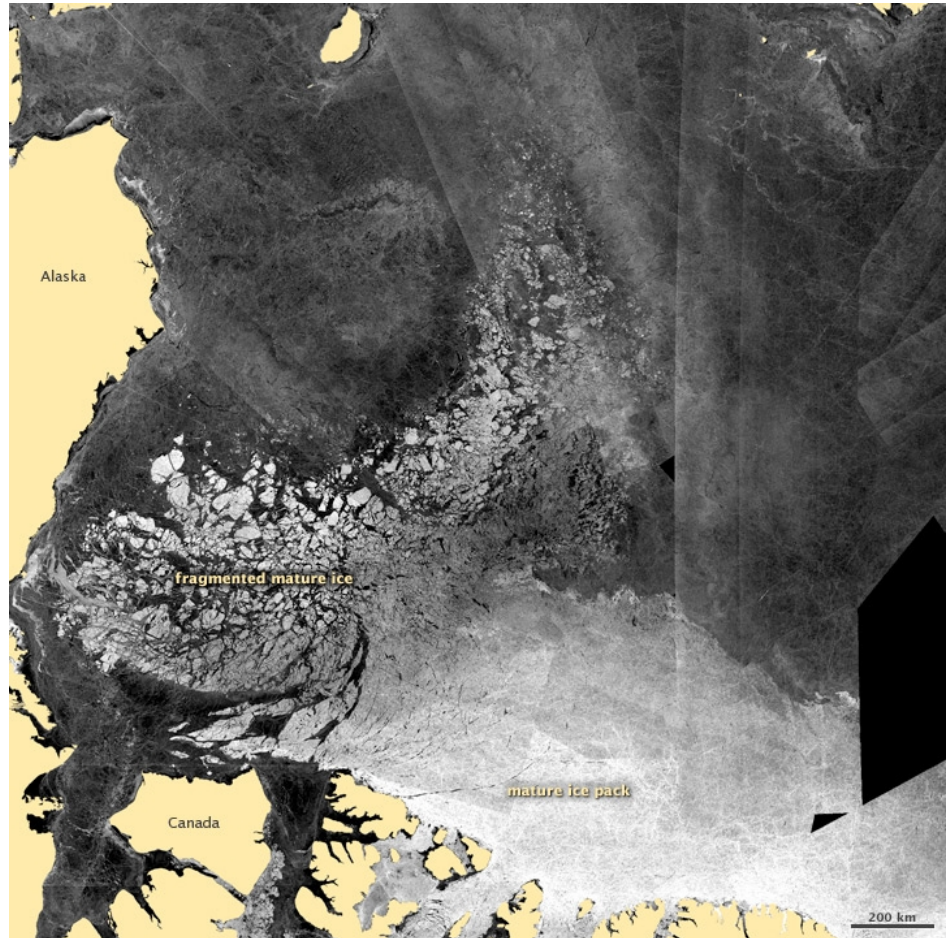
Posted November 10, 2010

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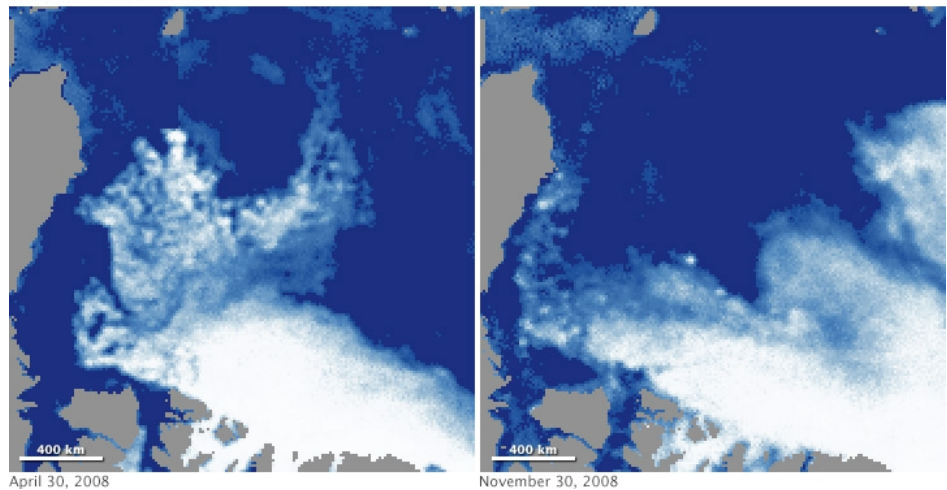
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RADARSAT mosaic, April 2008



April 30, 2008

November 30, 2008



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acquired April 30, 2008 - November 30, 2008

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By nearly all measures, the amount of sea ice in the Arctic Ocean has been shrinking since satellites first started taking measurements. Scientists have been particularly concerned about the disappearance of older "multi-year" ice, which usually grows thicker and more stable after surviving one or more summer melt seasons.

**Previous studies** by NASA's Joey Comiso and other scientists found that the Arctic has lost about 10 percent of its multi-year ice per decade since 1979. The floating ice either melts in place or it is "exported," pushed by winds or currents

### Image Location



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out of the Arctic. Some scientists asserted that wind-driven export was responsible for nearly all of the Arctic losses.

A [new analysis](#) has quantified for the first time the amount of multi-year ice that is being lost due to melting, and the percentage is significant. In the study, Ron Kwok and Glenn Cunningham of NASA's [Jet Propulsion Laboratory](#) used a range of satellite data to show that between 1993 and 2009, nearly 1,400 cubic kilometers (336 cubic miles) was lost due to melt, about 32 percent of the overall decline.

The top image above is a mosaic of satellite images from Canada's [RADARSAT](#). The synthetic aperture radar images show the movement of fragmented ice away from the ice sheet edge, an observation scientists can use to assess the loss of multi-year ice.

The bottom microwave radar images from NASA's [Quick Scatterometer \(QuikScat\)](#) show multi-year sea ice cover in the Arctic Ocean on April 30, 2008 (left) and November 30, 2008 (right). Bright white areas have the highest percentage of multi-year ice. Note how a large area of fragmented, multi-year ice in the Beaufort Sea (image center) has disappeared by the end of the summer melt.

To investigate the loss, Kwok and Cunningham examined data from a range of polar-observing satellites and instruments, including the Ice, Cloud and land Elevation Satellite ([ICESat](#)), the Advanced Microwave Scanning Radiometer (AMSR), QuikScat, RADARSAT-1, ERS-1 and ERS-2. The team compared summertime melt of multiyear ice in the Beaufort Sea with estimates of ice lost through Fram Strait—a major passage through which ice can exit the Arctic Ocean.

#### References

Kwok, R., and Cunningham, G.F. [Contribution of melt in the Beaufort Sea to the decline in Arctic multiyear sea ice coverage: 1993–2009](#). *Geophysical Research Letters*, Vol. 37, L20501, 5 pp. Accessed November 9, 2010.

NASA (2010, November 9). [NASA Study Quantifies Role of Melt in Loss of Old Arctic Sea Ice](#). Accessed November 9, 2010.

NASA (2009, July 7) [NASA Satellite Reveals Dramatic Arctic Ice Thinning](#). Accessed November 9, 2010.

NASA Images by Robert Simmon, adapted from Kwok 2010. [RADARSAT](#) image © 2010 Canadian Space Agency. Caption by Kathryn Hansen and Mike Carlowicz.

Instrument: RADARSAT

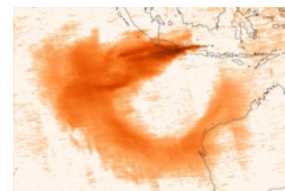
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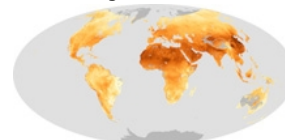
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