

# Older Arctic sea ice replaced by young, thin ice

January 11 2008

---



Thick, multiyear Arctic sea ice is disappearing, giving way thin, young ice, according to University of Colorado at Boulder study. Credit: James Maslanik, University of Colorado

A new study by University of Colorado at Boulder researchers indicates older, multi-year sea ice in the Arctic is giving way to younger, thinner ice, making it more susceptible to record summer sea-ice lows like the one that occurred in 2007.

The team used satellite data going back to 1982 to reconstruct past Arctic sea ice conditions, concluding there has been a nearly complete loss of the oldest, thickest ice and that 58 percent of the remaining perennial ice is thin and only 2-to-3 years old, said the lead study author,

Research Professor James Maslanik of CU-Boulder's Colorado Center for Astrodynamics Research.

In the mid-1980s, only 35 percent of the sea ice was that young and that thin according to the study, the first to quantify the magnitude of the Arctic sea ice retreat using data on the age of the ice and its thickness, he said.

"This thinner, younger ice makes the Arctic much more susceptible to rapid melt," Maslanik said. "Our concern is that if the Arctic continues to get kicked hard enough toward one physical state, it becomes increasingly difficult to reestablish the sea ice conditions of 20 or 30 years ago."

A September 2007 study by CU-Boulder's National Snow and Ice Data Center indicated last year's average sea ice extent minimum was the lowest on record, shattering the previous September 2005 record by 23 percent. The minimum extent was lower than the previous record by about 1 million square miles -- an area about the size of Alaska and Texas combined.

The new study by Maslanik and his colleagues appears in the Jan. 10 issue of *Geophysical Research Letters*. Co-authors include CCAR's Charles Fowler, Sheldon Drobot and William Emery, as well as Julienne Stroeve from CU-Boulder's Cooperative Institute for Research in Environmental Sciences and Jay Zwally and Donghui Yi from NASA's Goddard Space Flight Center in Greenbelt, Md.

The portion of ice more than five years old within the multi-year Arctic icepack decreased from 31 percent in 1988 to 10 percent in 2007, according to the study. Ice 7 years or older, which made up 21 percent of the multi-year Arctic ice cover in 1988, made up only 5 percent in 2007, the research team reported.

The researchers used passive microwave, visible infrared radar and laser altimeter satellite data from the National Oceanic and Atmospheric Administration, NASA and the U.S. Department of Defense, as well as ocean buoys to measure and track sections of sea ice.

The team developed "signatures" of individual ice sections roughly 15 miles square using their thickness, roughness, snow depth and ridge characteristics, tracking them over the seasons and years as they moved around the Arctic via winds and currents, Emery said. "We followed the ice in sequential images and track it back to where it had been previously, which allowed us to infer the relative ages of the ice sections."

The replacement of older, thicker Arctic ice by younger, thinner ice, combined with the effects of warming, unusual atmospheric circulation patterns and increased melting from solar radiation absorbed by open waters in 2007 all have contributed to the phenomenon, said Drobot. "These conditions are setting the Arctic up for additional, significant melting because of the positive feedback loop that plays back on itself."

Source: University of Colorado at Boulder

Citation: Older Arctic sea ice replaced by young, thin ice (2008, January 11) retrieved 18 April 2024 from <https://phys.org/news/2008-01-older-arctic-sea-ice-young.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.