

# Greenland ice sheet losing mass on northwest coast (w/ Video)

March 23 2010

---



New research indicates ice loss in Greenland is moving up the northwest coast.  
Credit: Greenland

(PhysOrg.com) -- Ice loss from the Greenland ice sheet, which has been increasing during the past decade over its southern region, is now moving up its northwest coast, according to a new international study.

Led by the Denmark Technical Institute's National Space Institute in Copenhagen and involving the University of Colorado at Boulder, the study indicated the ice-loss acceleration began moving up the northwest coast of Greenland starting in late 2005. The team drew their conclusions by comparing data from NASA's Gravity and Recovery Climate Experiment satellite system, or GRACE, with continuous GPS

measurements made from long-term sites on bedrock on the edges of the [ice](#) sheet.

The data from the GPS and GRACE provided the researchers with monthly averages of crustal uplift caused by ice-mass loss. The team combined the uplift measured by GRACE over United Kingdom-sized chunks of Greenland while the GPS receivers monitor crustal uplift on scales of just tens of miles. "Our results show that the ice loss, which has been well documented over southern portions of Greenland, is now spreading up along the northwest coast," said Shfaqat Abbas Khan, lead author on a paper that will appear in [Geophysical Research Letters](#).

The team found that uplift rates near the Thule Air Base on Greenland's northwest coast rose by roughly 1.5 inches, or about 4 centimeters, from October 2005 to August 2009. Although the low resolution of GRACE -- a swath of about 155 miles, or 250 kilometers across -- is not precise enough to pinpoint the source of the ice loss, the fact that the ice sheet is losing mass nearer to the ice sheet margins suggests the flows of Greenland outlet glaciers there are increasing in velocity, said the study authors.

"When we look at the monthly values from GRACE, the ice mass loss has been very dramatic along the northwest coast of Greenland," said CU-Boulder physics Professor and study co-author John Wahr, also a fellow at CU-Boulder's Cooperative Institute for Research in Environmental Sciences.

"This is a phenomenon that was undocumented before this study," said Wahr. "Our speculation is that some of the big glaciers in this region are sliding downhill faster and dumping more ice in the ocean."

Other co-authors on the new GRL study included Michael Bevis and Eric Kendrick from Ohio State University and Isabella Velicogna of the

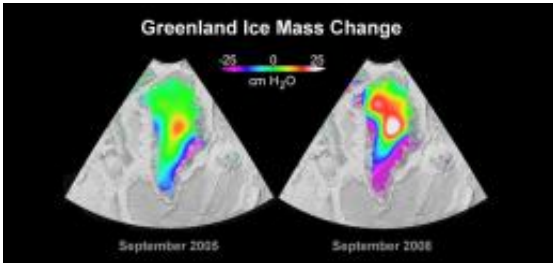
University of California-Irvine, who also is a scientist at NASA's Jet Propulsion Laboratory. GRL is published by the American Geophysical Union.

A 2009 study published in GRL by Velicogna, who is a former CU-Boulder research scientist, showed that between April 2002 and February 2009, the Greenland ice sheet shed roughly 385 cubic miles of ice. The mass loss is equivalent to about 0.5 millimeters of global sea-level rise per year.

"These changes on the Greenland ice sheet are happening fast, and we are definitely losing more ice mass than we had anticipated, " said Velicogna. "We also are seeing this ice mass loss trend in Antarctica, a sign that warming temperatures really are having an effect on ice in Earth's cold regions."

Researchers have been gathering data from GRACE since NASA launched the system in 2002. Two GRACE satellites whip around Earth 16 times a day separated by 137 miles and measure changes in Earth's gravity field caused by regional shifts in the planet's mass, including ice sheets, oceans and water stored in the soil and in underground aquifers.

"GRACE is unique in that it allows us to see changes in the ice mass in almost real time," said Velicogna. "Combining GRACE data with the separate signals from GPS stations gives us a very powerful tool that improves our resolution and allows us to better understand the changes that are occurring."



Changes in Greenland's ice mass as measured by NASA's Gravity Recovery and Climate Experiment (Grace) mission between September 2005 (left) and September 2008 (right). Image credit: NASA/JPL

In addition to monitoring the Thule [GPS receiver](#) in northwest Greenland as part of the new GRL study, the team also is taking data from GPS receivers in southern Greenland near the towns of Kellyville and Kulusuk. An additional 51 permanent GPS stations recently set up around the edges of the [Greenland ice sheet](#) should be useful to measure future crustal uplift and corresponding ice loss, said Wahr.

"If this activity in northwest Greenland continues and really accelerates some of the major [glaciers](#) in the area -- like the Humboldt Glacier and the Peterman Glacier -- Greenland's total [ice loss](#) could easily be increased by an additional 50 to 100 cubic kilometers (12 to 24 cubic miles) within a few years," said Khan.

Provided by University of Colorado at Boulder

Citation: Greenland ice sheet losing mass on northwest coast (w/ Video) (2010, March 23) retrieved 9 April 2024 from <https://phys.org/news/2010-03-greenland-ice-sheet-mass-northwest.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.