# Researchers witness overnight breakup, retreat of Greenland glacier

July 12 2010, by Mike Carlowicz


Images courtesy of DigitalGlobe

NASA-funded researchers monitoring Greenland's Jakobshavn Isbrae glacier report that a 7 square kilometer (2.7 square mile) section of the glacier broke up on July 6 and 7, as shown in the image above. The calving front - where the ice sheet meets the ocean - retreated nearly 1.5 kilometers (a mile) in one day and is now further inland than at any time previously observed. The chunk of lost ice is roughly one-eighth the size of Manhattan Island, New York.

Research teams led by Ian Howat of the Byrd Polar Research Center at Ohio State University and Paul Morin, director of the Antarctic

Geospatial Information Center at the University of Minnesota have been monitoring satellite images for changes in the Greenland ice sheet and its outlet glaciers. While this week's breakup itself is not unusual, Howat noted, detecting it within hours and at such fine detail is a new phenomenon for scientists.

"While there have been ice breakouts of this magnitude from Jakonbshavn and other glaciers in the past, this event is unusual because it occurs on the heels of a warm winter that saw no sea ice form in the surrounding bay," said Thomas Wagner, cryospheric program scientist at NASA Headquarters. "While the exact relationship between these events is being determined, it lends credence to the theory that warming of the oceans is responsible for the ice loss observed throughout Greenland and Antarctica."

The researchers relied on imagery from several satellites, including Landsat, Terra, and Aqua, to get a broad view of ice changes at both poles. Then, in the days leading up to the breakup, the team received images from DigitalGlobe's WorldView 2 satellite showing large cracks and crevasses forming.

DigitalGlobe Inc. provides the images as part of a public-private partnership with U.S. scientists. Howat and Morin are receiving near-daily satellite updates from the Jakobshavn, Kangerlugssuaq, and Helheim glaciers (among the islands largest) and weekly updates on smaller outlet glaciers.

Jakobshavn Isbrae is located on the west coast of Greenland at latitude 69°N and has been retreated more than 45 kilometers (27 miles) over the past 160 years, 10 kilometers (6 miles) in just the past decade. As the glacier has retreated, it has broken into a northern and southern branch. The breakup this week occurred in the north branch.

Scientists estimate that as much as 10 percent of all ice lost from Greenland is coming through Jakobshavn, which is also believed to be the single largest contributor to sea level rise in the northern hemisphere. Scientists are more concerned about losses from the south branch of the Jakobshavn, as the topography is flatter and lower than in the northern branch.

In addition to the remote sensing work, Howat, Morin, and other researchers have been funded by NASA and the National Science Foundation to plant GPS sensors, cameras, and other scientific equipment on top of the ice sheet to monitor changes and understand the fundamental workings of the ice. NASA also has been conducting twice-yearly airborne campaigns to the Arctic and Antarctic through the IceBridge program and measuring ice loss with the ICESat and GRACE satellites.

Provided by NASA's Goddard Space Flight Center

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