

Antarctic Ice Loss Speeds Up, Nearly Matches Greenland Loss

by Staff Writers

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Ice loss in Antarctica increased by 75 percent in the last 10 years due to a speed-up in the flow of its glaciers and is now nearly as great as that observed in Greenland, according to a new, comprehensive study by NASA and university scientists. In a first-of-its-kind study, an international team led by Eric Rignot of NASA's Jet Propulsion Laboratory, Pasadena, Calif., and the University of California, Irvine, estimated changes in Antarctica's ice mass between 1996 and 2006 and mapped patterns of ice loss on a glacier-by-glacier basis.

They detected a sharp jump in Antarctica's ice loss, from enough ice to raise global sea level by 0.3 millimeters (.01 inches) a year in 1996, to 0.5 millimeters (.02 inches) a year in 2006.

Rignot said the losses, which were primarily concentrated in West Antarctica's Pine Island Bay sector and the northern tip of the Antarctic Peninsula, are caused by ongoing and past acceleration of glaciers into the sea. This is mostly a result of warmer ocean waters, which bathe the buttressing floating sections of glaciers, causing them to thin or collapse. "Changes in Antarctic glacier flow are having a significant, if not dominant, impact on the mass balance of the Antarctic ice sheet," he said.

To infer the ice sheet's mass, the team measured ice flowing out of Antarctica's drainage basins over 85 percent of its coastline. They used 15 years of satellite radar data from the European Earth Remote Sensing-1 and -2, Canada's Radarsat-1 and Japan's Advanced Land Observing satellites to reveal the pattern of ice sheet motion toward the sea. These results were compared with estimates of snowfall accumulation in Antarctica's interior derived from a regional atmospheric climate model spanning the past quarter century.

The team found that the net loss of ice mass from Antarctica increased from 112 (plus or minus 91) gigatonnes a year in 1996 to 196 (plus or minus 92) gigatonnes a year in 2006. A gigatonne is one billion metric tons, or more than 2.2 trillion pounds. These new results are about 20 percent higher over a comparable time frame than those of a NASA study of Antarctic mass balance last March that used data from the NASA/German Aerospace Center Gravity Recovery and Climate Experiment. This is within the margin of error for both techniques, each of which has its strengths and limitations.

Rignot says the increased contribution of Antarctica to global sea level rise indicated by the study warrants closer monitoring.

"Our new results emphasize the vital importance of continuing to monitor Antarctica using a variety of remote sensing techniques to determine how this trend will continue and, in particular, of conducting more frequent and systematic surveys of changes in glacier flow using satellite radar interferometry," Rignot said. "Large uncertainties remain



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in predicting Antarctica's future contribution to sea level rise. Ice sheets are responding faster to climate warming than anticipated."

Rignot said scientists are now observing these climate-driven changes over a significant fraction of the West Antarctic Ice Sheet, and the extent of the glacier ice losses is expected to keep rising in the years to come. "Even in East Antarctica, where we find ice mass to be in near balance, ice loss is detected in its potentially unstable marine sectors, warranting closer study," he said.

Other organizations participating in the NASA-funded study, in addition to the University of California, Irvine, are Centro de Estudios Científicos, Valdivia, Chile; University of Bristol, United Kingdom; Institute for Marine and Atmospheric Research, Utrecht University, Utrecht, The Netherlands; University of Missouri, Columbia, Mo.; and the Royal Netherlands Meteorological Institute, De Bilt, The Netherlands. Results of the study are published in February's issue of Nature Geoscience

Arctic ice-cap loss twice the size of France: research

by Staff Writers

Paris (AFP) Jan 23, 2008

The Arctic ice cap has shrunk by an area twice the size of France's land mass over the last two years, the Paris-based National Centre for Scientific Research (CNRS) said Wednesday.

"The year 2008 promises to be a critical year on every level," said Jean-Claude Gascard, the body's research director and coordinator of European scientific mission Damocles, which is monitoring the effects of climate change across the Arctic.

September 2007 measurements show ice covering 4.13 million square kilometres (1.6 million square miles), down from 5.3 million square kilometres in 2005.

"Melting could result in the loss of another million in one (2008) summer," he added at a press conference.

"Summer 2007 was marked by a major retreat in the ice-cap, one we were not anticipating," Gascard said. "The rate of decline is also two or three times faster than (observed) beforehand."

International models used to predict retreating ice have some "catching-up" to do, he said.

Over the last 20 years, 40 percent of the ice-cap has melted with the average thickness halved from three to 1.5 metres.

Year-round ice coverage has reduced, with summer melting also lasting longer, the centre reported.



The Damocles' exploration vessel Tara has been able to cross the 5,000-kilometre Arctic Ocean in just over 16 months -- less than half the time taken by a late 19th century Norwegian explorer.

Gascard said the ship had been able to travel at "twice the pace expected by organisers, and three times the speed models suggested".

Disruption to the thermal layers of atmosphere stacked over Earth's far north was cited as the principal cause by Swedish researchers earlier this month, in a study published in the journal Nature.

The Tara team recorded a temperature of 10 degrees Celsius (50 degrees Fahrenheit) at altitudes between 500 and 1,000 metres.

"The reduction in the intensity of cold (temperatures) during winter over these last 20 years corresponds to an accumulation (rise) of 1,000 degrees Celsius," Gascard said.

The team highlighted the role of ocean currents, namely in the northern Pacific, behind warming of waters.

Gascard's research colleague, Gerard Ancelet, also spoke of recently-formed Arctic mist - pollution clouds which "trap" Earth's naturally-emitted infrared rays thereby raising temperatures.

"Internal" Arctic pollution is the source, Ancelet said, highlighting Russian and northern Scandinavian gas and oil exploitation.

Carbon dioxide emissions among the major north American, European and south-east Asian economies was not the only other factor, he added.

Shipping traffic with additional nitrogen oxide emissions is a growing complication, given he estimated that 25 percent of the increase in future maritime transport "will be confined to the Arctic zone".

In summer 2007, the Northwest Passage, historically an ice-jammed potential shortcut between Europe and Asia, was "fully navigable" for the first time since monitoring began in 1978, according to the European Space Agency.

It lasted five weeks, according to Canada's environment ministry, with 100 vessels getting through.