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The 800-pound Gorilla

June 25, 2009

For some years now, glaciologists have been tip-toeing around the Greenland ice sheet with the earth-science equivalents of stethoscopes, like veterinary doctors trying to very carefully take the pulse of a fitfully sleeping gorilla. There are good reasons for this.



As NASA's chief ice scientist Waleed Abdalati explains in an audio you can hear by clicking on this image, Greenland contains enough fresh water to raise global sea level 23 feet if all of the ice were to melt. Of course, all of its doesn't have to melt to cause very serious problems around the world. Rapid influx of meltwater could change climate by altering patterns of ocean circulation.

In the face of rising temperatures in the atmosphere and the oceans at high latitudes, there are signs that the

Greenland gorilla is waking. Especially since the beginning of the new century, the ice sheet has been giving up mass to the surrounding seas faster than it has been gaining mass as falling snow.

The authoritative 2007 report of the Intergovernmental Panel on Climate Change saw Greenland as only a modest contributor to future sea level rise, although it characterized the question as one of the bigger unknowns in the field. Estimates have increased as the melt rate has been accelerating, and ice specialists have been working overtime to figure out

just how this great block of frozen fresh water, two miles deep in places, responds to a warming world.

Most recently, University of Buffalo researcher Jason Briner and colleagues report in the journal *Nature Geoscience* results of a study of a Canadian Arctic glacier just across Baffin Bay that "rapidly deglaciated about 9,500 years ago." Like those draining Greenland, the Sam Ford Fjord was a tidewater glacier, its terminus floating on warming ocean water. Rapid retreat occurred when water under the floating ice was a kilometer or more deep -- conditions which mirror those under the big Jakobshavn Glacier flowing out of Greenland across Baffin Bay. Click on the image at right and watch a fascinating video as NASA's Abdalati describes what has been happening at the Jakobshavn Glacier.



Briner said his findings "suggest that contemporary tidewater glaciers in Greenland and Antarctica that are retreating into deep waters may begin to experience even faster rates of retreat than are currently being observed."

For all the work underway, too much is still not known. There is modeling evidence that the flows from these tidewater glaciers slow when their advancing edges reach back onto land, but there is a real gap in understanding of how the Greenland ice sheet has responded to changes over the last several centuries -- between the meticulous pulse-taking of current observations and the blurry pictures that come from geological evidence of the distant past. Bridging that gap is the focus of researcher Andrew Long, writing in the current issue of *GSA Today*, the journal of the Geological Society of America. "Only then will we reduce the considerable uncertainty that presently exists regarding the contribution of the Greenland Ice Sheet to past and future sea-level change," he concludes.

- John D. Cox

IMAGES: NOAA, NASA

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Why don't we build a fence around outlets. Like the border fence, but to keep the freshwater from going out to the ocean? Is that too hard, I bet it would be cheaper then dealing with climate change or going to mars.

Posted by: [john](#) | [June 26, 2009 at 10:12 AM](#)

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