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Glaciers Flow to Sea at a Faster Pace, Study Says

By ANDREW C. REVKIN

The amount of ice flowing into the sea from large glaciers in southern Greenland has almost doubled in the last 10 years, possibly requiring scientists to increase estimates of how much the world's oceans could rise under the influence of global warming, according to a study being published today in the journal Science.

The study said there was evidence that the rise in flows would soon spread to glaciers farther north in Greenland, which is covered with an ancient ice sheet nearly two miles thick in places, and which holds enough water to raise global sea levels 20 feet or more should it all flow into the ocean.

The study compared various satellite measurements of the creeping ice in 1996, 2000 and 2005, and was done by researchers at NASA's Jet Propulsion Laboratory in Pasadena, Calif., and the University of Kansas.

Glaciers are creeping rivers of ice that accelerate or slow and grow thicker or shrink depending on the interplay of a variety of conditions including rates of snowfall and temperature and whether water lubricates the interface between ice and the rock below.

Sometimes the rate of movement in a particular glacier can change abruptly, but the speedup in Greenland has been detected simultaneously in many glaciers, said Eric J. Rignot, the study's author, who has extensively studied glacier flows at both ends of the earth.

"When you have this widespread behavior of the glaciers, where they all speed up, it's clearly a climate signal," he said in an interview. "The fact that this has been going on now over 10 years in southern Greenland suggests this is not a short-lived phenomenon."

Richard B. Alley, an expert on Greenland's ice at Pennsylvania State University who did not participate in the study, agreed that the speedup of glaciers in various places supported the idea that this was an important new trend and not some fluke.

"There's no way that the Jakobshavn Glacier on the west side can call up the Helheim on the other side of the ice sheet and say, 'Let's get going,' " he said.

A separate commentary published in Science by Julian A. Dowdeswell of the Scott Polar Research Institute in Britain noted that the rising flows could be a result of both the rapid deterioration of the miles of floating "tongues" of ice where the glaciers enter the sea and an increase in water melting on the ice surface and percolating down through crevasses, where it can reduce friction with the underlying rock.