Greenland's huge ice sheet may melt faster than previously thought -- study

Lauren Morello, Environment & Energy Publishing, 3-12-12

The Greenland ice sheet may be less resistant to rising temperatures than scientists had suspected.

New research suggests a temperature rise of 1.6 degrees Celsius above the preindustrial level could be enough to consign the massive ice sheet to irreversible melting.

"This tipping point for Greenland is closer than we thought, and we might be crossing it soon," said study co-author Andrey Ganopolski, a researcher at the Potsdam Institute for Climate Impact Research.

But how long that thaw would take varies depending on how hot the planet gets, and for how long, finds the study published yesterday in *Nature Climate Change*.

At 2 degrees Celsius of warming, it would take 50,000 years for Greenland's ice sheet to disappear completely -- what Ganopolski describes as "infinitely long."

But the process speeds up as the mercury rises, the new study suggests, based on an analysis of simulations created using a regional climate model that includes the Greenland ice sheet.

Ganopolski and his colleagues estimate it would take 8,000 years to melt Greenland's ice away if the temperature rise hits 4 degrees Celsius, and just 2,000 years if warming reaches 8 degrees Celsius.

"In a sense, the 1.6-degree threshold is a point of no practical importance," Ganopolski said. "But what we show is that the higher you are above this threshold, the faster the ice sheet will melt."

A closer tipping point?

If 2,000 years still seems like a very long goodbye, that translates to an average of 35 centimeters (13.25 inches) of sea level rise every century during that period. Overall, the Greenland ice sheet contains enough fresh water to raise sea level by 7 meters – almost 23 feet.

The numbers suggest that even thawing a fraction of Greenland's ice in a short period of time could bring devastating consequences to coastal communities around the world.

"Even on a time scale of thousands of years, [Greenland's contribution to sea level rise] could be very important," Ganopolski said.

The global average temperature has risen about 0.8 degree Celsius since 1880, halfway to the threshold identified in the new paper.

The new results are substantially lower than previous estimates calculated using so-called indirect methods, such as estimating the future frequency of days during which the temperature is above freezing. Those studies suggested the threshold beyond which Greenland's ice would be set on an irreversible course to total melt lay between 1.9 and 5.1 degrees Celsius, with a best estimate of 3.1 degrees Celsius.

The new study lists a best estimate of 1.6 degrees Celsius, with a range of 0.8 to 3.2 degrees Celsius.