

# Warming to devastate glaciers, Antarctic icesheet - studies

January 9 2011

---



Global warming may wipe out three-quarters of Europe's alpine glaciers by 2100 and hike sea levels by four metres (13 feet) by the year 3000 through melting the West Antarctic icesheet, two studies published on Sunday said.

Global warming may wipe out three-quarters of Europe's alpine glaciers by 2100 and hike sea levels by four metres (13 feet) by the year 3000 through melting the West Antarctic icesheet, two studies published on Sunday said.

The research places the spotlight on two of the least understood aspects of climate change: how, when and where warming will affect glaciers on which many millions depend for their water, and the problems faced by generations in the far distant future.

The glacier study predicts that mountain glaciers and icecaps will shrink

by 15-27 percent in volume terms on average by 2100.

"Ice loss on such a scale may have substantial impacts on regional hydrology and [water availability](#)," it warns.

Some regions will be far worse hit than others because of the altitude of their glaciers, the nature of the terrain and their susceptibility to localised warming.

New Zealand could lose 72 percent (between 65 and 79 percent) of its glaciers, and Europe's Alps 75 percent, meaning a range of between 60 and 90 percent. At the other end of the scale, glacial loss in Greenland is predicted at around eight percent and at some 10 percent in high-mountain Asia.

[Meltwater](#) will drive up world sea levels by an average of 12 centimetres (five inches) by 2100, says the study.

This figure -- which does not include expansion by the oceans as they warm -- largely tallies with an estimate in the landmark Fourth Assessment Report by the UN's Intergovernmental Panel on Climate Change (IPCC) in 2007.

Geophysicists Valentina Radic and Regine Hock of the University of Alaska base these calculations on a [computer model](#) derived from records for more than 300 glaciers between 1961 and 2004.

The model factors in the middle-of-the-road "A1B" scenario for greenhouse-gas emissions, by which Earth's mean surface temperature would rise by 2.8 degrees Celsius (5.04 degrees Fahrenheit) during the 21st century.

The tool was then applied to 19 regions that contain all the world's

glaciers and icecaps.

But -- importantly -- it does not include the icesheets of Antarctica and Greenland, where 99 percent of Earth's fresh water is locked up.

If either of these icesheets were to melt significantly, sea levels could rise by an order of metres (many feet), drowning coastal cities.

That very scenario emerges in the second study, which focuses on the inertial effect of greenhouse gases. Carbon molecules emitted by fossil fuels and deforestation linger for many centuries in the atmosphere before breaking apart.

Even if all these emissions were stopped by 2100, the warming machine would continue to function for centuries to come, says the investigation.

It largely bases its forecast on the "A2" emissions scenario, which sees greater carbon pollution by 2100, stoking Earth's temperature by an average 3.4 C (6.1 F) by century's end.

Warming of the middle depths of the Southern Ocean could unleash the "widespread collapse" of the West Antarctic icesheet by the year 3000, it says.

"The inertia in intermediate and deep ocean currents driving into the southern Atlantic means those oceans are only now beginning to warm as a result of CO<sub>2</sub> (carbon dioxide) emissions from the last century," said Shawn Marshall, a professor the University of Calgary in Canada.

"The simulation showed that warming will continue, rather than stop or reverse, on the thousand-year timescale."

The two studies are published online by the journal *Nature Geoscience*.

(c) 2011 AFP

Citation: Warming to devastate glaciers, Antarctic icesheet - studies (2011, January 9) retrieved 25 April 2024 from <https://phys.org/news/2011-01-devastate-glaciers-antarctic-icesheet-.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.