

The melting of Canada's glaciers is irreversible

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See Canada's glaciers while you still can. Their melting is irreversible, according to projections based on real-world data and validated by satellite images.

By the end of the century, a fifth of the Canadian ice sheet – the world's third largest – could be gone for good, raising average global sea levels by 3.5 centimetres.

If the whole ice sheet melts, it would raise the global sea level by about 20 centimetres, a fraction of the 70 and 7 metre rises expected respectively if [Antarctica](#) and [Greenland](#) each shed all their ice.

The Canadian melt seems paltry in comparison, but it becomes significant when the effects of other smaller ice fields melting are taken into account, says [David Vaughan](#), leader of [ice2sea](#), the European Union programme that supported the work.

"Most attention goes out to Greenland and Antarctica, which is understandable because they're the two largest ice bodies in the world," says co-leader of the study, [Michiel van den Broeke](#) of Utrecht University in the Netherlands. "But with this research we want to show that the Canadian ice caps should be included in [sea level] calculations."

Temperature rise

Van den Broeke and his colleagues based their projections on measurements of the receding ice. Since 2000, the average temperature in the region has risen by between 1 and 2°C, accelerating the melting.

From 2004 to 2011, an extra 579 gigatonnes of ice melted into the sea, enough to raise the global sea level by more than a millimetre. The team also calculated that the loss is accelerating, from 31 gigatonnes a year in 2005 to 92 gigatonnes in 2008.

They predict that the ice is unlikely to return because the process is raising local temperatures. Snow and sea ice reflect sunlight, and as they disappear they leave exposed sea and land surfaces that absorb heat instead.

This, say the researchers, could raise the local temperature by as much as 8°C even if globally, temperatures only rise by 3°C. "The chances of it growing back are extremely slim," says lead author, [Jan Lenaerts](#), also at Utrecht.

Unstoppable melt

We should also keep our eyes on ice sheets in Alaska, the [Russian high Arctic](#), Svalbard and Patagonia, says Vaughan.

These share characteristics with the Canadian glaciers. First, they are regions where the climate is changing most rapidly. Second, we have only imprecise measurement of the thickness of

their ice. And third, they all have "feet" in the oceans and so can be affected by oceanic and atmospheric temperature swings. "All these areas are doing similar things," says Vaughn.

Worst of all, it looks like the Canadian melt is unstoppable. "With current rates of projected temperature rise, we're committed to losing this ice," says Vaughan. "Unless we can really slow warming down at a phenomenal rate, it's unlikely we can do anything about this, but it is worth trying because we can do something about the [others]."

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