

Two-thirds of glacier ice in the Alps 'will melt by 2100'

If emissions continue to rise at current rate, ice will have all but disappeared from Europe's Alpine valleys by end of century

By **Damian Carrington** Environment editor/*theguardian.com*/Tue 9 Apr 2019



The Rhône glacier was the largest in the European Alps during the most recent ice age, approximately 20,000 years ago. Since then, it has receded to a typical valley glacier. Photograph: Matthias Huss/Cryosphere/EGU

Two-thirds of the ice in the glaciers of the Alps is doomed to melt by the end of the century as climate change forces up temperatures, a study has found.

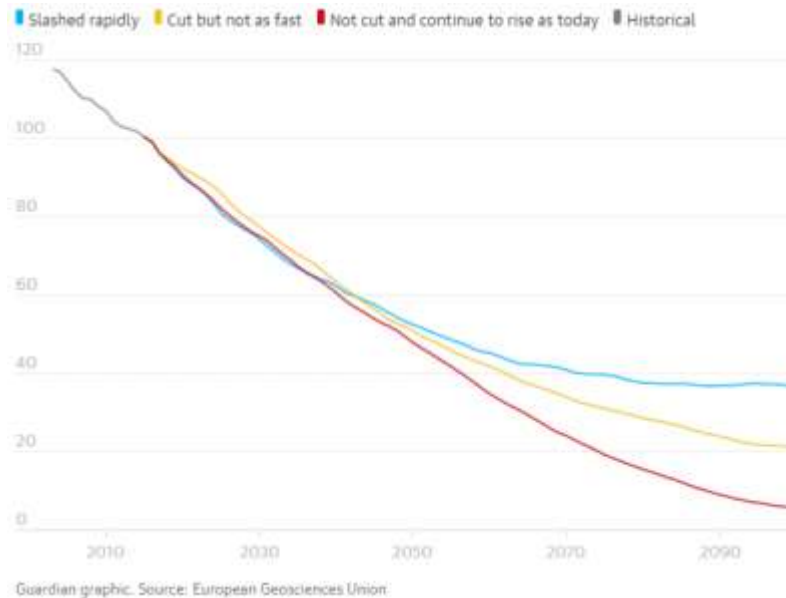
Half of the ice in the mountain chain's 4,000 glaciers will be gone by 2050 due to global warming already baked in by past emissions, the research shows. After that, even if carbon emissions have plummeted to zero, two-thirds of the ice will still have melted by 2100.

If emissions continue to rise at the current rate, the ice tongues will have all but disappeared from Alpine valleys by the end of the century. The researchers said the loss of the glaciers would have a big impact on water availability for farming and hydroelectricity, especially during droughts, and affect nature and tourism.

"Glaciers in the European Alps and their recent evolution are some of the clearest indicators of the ongoing changes in climate," said Daniel Farinotti, a glaciologist at ETH Zurich in Switzerland and one of the research team.

Alpine glaciers are likely to lose half their volume by 2050 regardless of any emission cuts

Decline in glacier volume index (2015 = 100). Averages of climate models in which emissions are:



“In the pessimistic case, the Alps will be mostly ice-free by 2100, with only isolated ice patches remaining at high elevation, representing 5% or less of the present-day ice volume,” said Matthias Huss, a senior researcher at ETH Zurich.

In February, a study found that a **third of the huge ice fields in Asia’s towering mountain chains** were also doomed to melt because of climate change, with serious consequences for almost 2 billion people downstream.

Glaciers along the Hindu Kush and Himalayan range are at higher, colder altitudes, but if global carbon emissions are not cut, two-thirds of their ice will melt by 2100.

Melting glaciers contribute to rising sea levels, but almost three-quarters of this water comes from Greenland and Antarctica. The Hindu Kush Himalayas, Patagonia and Iceland are also significant. The European Alps, which run through France, Switzerland, Italy, Austria and Germany, contribute less than 1%.

The latest research, published in the journal *The Cryosphere* and presented at the European Geosciences Union conference in Vienna, Austria, on Tuesday, combined computer models with real world data to forecast the fate of the glaciers. It used 2017 as its starting point.

Unlike previous work, the models explicitly included how the glaciers move down the mountains. This led to lower projected ice losses compared with earlier research.

Applying this approach to other glaciated mountain chains could improve ice loss forecasts there, the researchers said.

Cutting the emissions from fossil-fuel burning, deforestation and other polluting activities is the biggest factor in minimising the melting of the ice. Farinotti said: “The future of these glaciers is indeed at risk, but there is still a possibility to limit their future losses.”