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## Glacial Retreat

*A child born in Switzerland today will likely live to see the turn of the 22nd century. If scientists are right, the views they'll see will have changed remarkably.*

*For one, they will likely shiver less in winter and only see glaciers in the highest reaches of the Alps. It's a grim vision of a future depleted of snow and ice, but it's a vision that can be avoided. Well, sort of.*

This past year alone was nigh-on catastrophic for Switzerland's glaciers.

Matthias Huss, a glaciologist at the University of Fribourg, tells *The Local* that many of Switzerland's glaciers were snow-free by July this year. That meant the icy surfaces of glaciers were at the direct mercy of the sizzling August temperatures. The result is that over a single year, three percent of Swiss glacial mass melted away.

"That's enough ice melt to provide every single Swiss household with a rather cold 25m<sup>2</sup> swimming pool," Huss says. "This really indicates that losing all the glaciers in Switzerland is not that far away," he warns.

That's not to say that the epic ice loss of 2017 will be necessarily repeated next year, nor even in the next five years. But, Huss explains, "Swiss glaciers are still going through a steep decline with no end in sight. For the past 30 years they've been losing mass, sometimes in epic proportions, other times in small amounts."

The result of all this loss is that by 2100, when a Swiss child born in 2017 is lighting their 83rd birthday candle, there'll be far fewer glaciers left in Switzerland, with up to 90 percent of them lost.

"The troubling thing is that this is not even that much dependent on future CO<sub>2</sub>," says Huss.

He points to the Aletsch glacier, which is currently the longest glacier in Europe. "Unfortunately it's too big for the current climate. Even if temperatures stabilize, glaciers such as the Aletsch keep on melting for a time until they retreat to a place they can survive," says Huss. Unfortunately, the Alps just aren't high enough to offer refuge.

"We cannot preserve the Aletsch glacier, for example, with its beautiful glacial tongue, even with strongly reduced CO<sub>2</sub> emissions," Huss continues.

The Aletsch won't disappear altogether, but it will likely retreat nearer to the Jungfraujoch and become a shadow of what it once was, with around 70-80 percent of its current volume reduced to meltwater.

### Snow's not so sure

Glacier-lovers may have a grim view of the future in Switzerland, but skiers need not despair completely – for now.

Christoph Marty, of the Institute for Snow and Avalanche Research, is more optimistic about what's to come. "That's because we can still do something about the amount of snowfall in Switzerland," he says.

"We say that glaciers have a memory," Marty tells *The Local*, "A bad year with little snow and lots of melt means they have a bad start to the next year." However, for snow, "each year is like resetting the dial back to zero".

In a study released earlier this year, Marty and his team said that snow cover will largely disappear from the Alps by 2100. That's hardly great news, but crucially, his research points out that this is dependent on CO<sub>2</sub> emissions and the amount of warming that happens between now and then.

"If we don't cut emissions, enough snow for winter sports can only be guaranteed above 2,500 metres," the researchers said in a statement back in February.

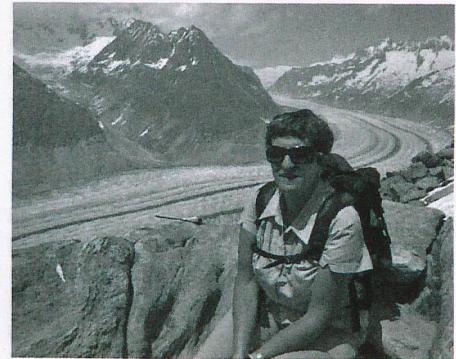
Since less snowfall also comes with a loss of snow days in general, the ski season simultaneously shortens while snow cover worsens – bad news for skiers.

Marty believes that as things stand, we are probably on course to raise the snow-sure altitude level from its current 1,400 metres by a good 500-700 metres. But if we tackle emissions then that could be reduced greatly.

However, that seems a big 'if'.

Switzerland, for its part, is committed to the Paris agreement and aims to halve its CO<sub>2</sub> emissions by 2030 compared to 1990 levels. The new Energy Strategy 2050, which entered into force on January 1st 2018, also envisages a Switzerland that's more energy efficient and less reliant on fossil fuels.

But with the US pulling out of Paris, it remains to be seen if enough can be done worldwide to tackle climate change.



### Not such a quick fix

By now, you're probably thinking perhaps these problems could be fixed with a few good snow blowers. These water and energy hungry snow producers are now a common sight at many alpine ski resorts. Couldn't they be used to save glaciers?

Glaciologist Felix Keller has been figuring out how to put them to use to save the Morteratsch glacier. He plans to blow snow over the glacier during the summer months to ward off any melt. Previously, it had been thought that thousands of snow machines would be needed, but Keller's new calculations mean that only around 200 would be needed, he tells *The Local*.

However he concedes this would be a stop-gap measure and that glaciers cannot be saved forever – we can only slow their decline. On top of that, using snow blowers is incredibly costly, both financially and environmentally, making it a measure that Huss says simply isn't feasible across the hundreds of glaciers in Switzerland.

Efforts to save glaciers should only be considered if it's absolutely essential to preserve water sources, says Keller, who is concerned about what the loss of glaciers means for freshwater availability, particularly during summer time, something that's not yet entirely clear.

So it's likely we can't engineer our way out of this one. Switzerland's glaciers are melting away, one year after another, and while we can still hope to see snow-sure slopes for some time to come, as temperatures rise this will become more challenging and be at further cost to the environment. What is sure is that children born today or in the coming decades will look out on to an alpine landscape that's vastly different from our own.