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"IF YOU WANT TO ENJOY GLACIERS, YOU SHOULD DO IT SOON"

Glaciologists from all over the world have published an open letter in the journal "Nature", urging action against climate change at the UN Climate Change Conference in Madrid. One of the co-authors of the letter is the OeAW glaciologist Andrea Fischer. In an interview she explains the situation is changing as a result of global warming and why we need to act now.



Worldwide, glaciers are melting due to climate change. The picture shows the Ngozumpa glacier in the Himalayas, the largest ice flow in Nepal.

The current rate of glacial melting worldwide is "unprecedented," and is likely to have a major impact on the water supply and the environment. The letter to the participants of the 25th UN Climate Change Conference in Madrid. According to the article (whose first author is a glaciologist from the University of Vienna), the increase in global average temperature has caused glaciers around the world to lose around 9,000 gigatons of ice since 1960.

To convey the magnitude of loss, a comparison, which the glaciologists use in their letter, helps: the lost ice mass would be enough to cover the entire Earth in a layer of ice. This alone has raised the sea level by three centimeters, say the scientists – among them Andrea Fischer from the Institute of Geography and Geoecology of the Austrian Academy of Sciences (OeAW). If the melting continues unabated, glaciers could be history in just a few generations. "The smallest glaciers are disappearing, especially in the Eastern Alps", Fischer explains in an interview.

Glaciologists see the effects of climate change directly. Why is the open letter in "Nature" only being published now?

Andrea Fischer: Every ten years, the national experts in the field meet, and then we have the opportunity to take joint action regularly for 125 years now. We have data that clearly shows the results of global warming. That's why we must do something

The letter states that there might be no more glaciers by the year 2300. Do we still have time to take countermeasures?

Fischer: Here in the Alps, we focus our future scenarios on the period up until the end of the current century. Since 1990 we know there will likely be hardly any glaciers left by the end of the century, while the situation is a little less dramatic in the Western Alps. The Antarctic are fortunately much more stable.

“ Since 1990 we have seen glaciers recede considerably – in the Eastern Alps there will likely be hardly any glaciers left

if we will be living in a plastic world or if we will have gone back to living like people in the Stone Age. But we should not bury our heads in the sand of climate change, that's clear. The warming is expected to continue unchanged over the next ten years. But we can influence

Are glaciers shrinking everywhere?

Fischer: The small European glaciers are strongly affected because of their low position, especially in the Eastern Alps. In the Alps there are glaciers that are actually growing. This is probably not due to the climate, but to the natural rhythms of these glaciers, which naturally declines. Here, too, warming will bring about a decline in the longer term. At high altitudes, the melting of the glaciers also pro

When is a glacier considered to have disappeared?

Fischer: We are now being forced to come up with a definition here. Is a glacier gone when it reaches a minimum limit or only when it becomes a debris-ice mixture, may last a long time even in warm conditions. Only now are we developing theories, because we did not

“ We have the potential to fight climate change, but whether that is enough to save the glaciers in the Alps is uncertain.

one hand, the comparative images documenting drastic glacial retreats in the 20th century are very impressive. They show people that is happening here. On the other hand, glaciers were crucial for understanding climate change. We know that the glaciers in Central Europe. That's how we found that the climate is changeable. Glaciologists have also contributed to clarifying the role of CO₂ as a green

Are there models that can explain glacial retreat without human influence?

Fischer: The connection between glacial retreat and humans comes from our atmosphere models. That's because, in the end, it's not their cause. There are discussions on alternative causes of glacial retreat, but they cannot explain the current trend. It's clear: people are responsible.

“ Instead, we need to look at how the world will change as the glaciers disappear.

over a hundred years' worth of data. This is both a lot and not very much – more than in most regions of the world, but not enough. It will be better. From today's perspective, even glacier forecasts have an uncertainty of 50% by the end of the century. This is also true of the glaciers. In Austria, the glaciers are so small that they are at the limit of resolution of today's models. This further increases the risk of 10–70% glacial loss. If you want to enjoy glaciers, you should do it soon.

So, the outlook for the local glaciers is not very good?

Fischer: Luckily, much of the ice is in the big polar glaciers. The glaciers in the Alps and in the Himalayas are rather insignificant but whether that is enough to save the glaciers in the Alps is uncertain. We do not know for sure whether the Alps have ever had more ice. If there is further warming, the Alpine glaciers will continue to lose mass and perhaps disappear. This cannot be stopped by artificial snow. Instead, we need to look at how the world will change as the glaciers disappear.

“ As the glaciers melt, the sea level rises, threatening valuable settlement areas. In the Alps, the glaciers stabilize the subsoil, preventing mudslides and rockfalls.

melting makes climate change visible. But it also impacts human living spaces. As the glaciers melt, the sea level rises, threatening coastal areas. The water from the melt brings few problems, but as we have already seen in Switzerland, melting glaciers can lead to landslides in mountainous areas. Vegetation colonizes the exposed areas quickly, but not immediately.



The Eastern Alps are particularly affected by climate change. The Jamtalferner in Tyrol in 2003 ... © ÖAW



... and in 2018. © ÖAW

AT A GLANCE

Andrea Fischer is Interim Director of the [Institute for Interdisciplinary Mountain Research of the OeAW](#) and Corresponding Member of the [World Glacier Monitoring Service \(WGMS\)](#). The network of experts initiated the open letter to "Nature" on glacial melting.

The open letter is entitled "[Glacier monitoring tracks progress in limiting climate change](#)" and was published via Open Access on [Nature](#).

CLIMATE RESEARCH

The causes and consequences of climate change for the environment, people and society were the focus of research projects, and more climate research can be found on the Academy's website.

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