

New Zealand's glaciers are shrinking

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New Zealand's glaciers are some of our most prized landmarks, valued by residents and visitors alike. But according to scientific data, these glaciers are shrinking, melting into the ocean and causing the sea level to rise. Scientists at Victoria University of Wellington's Antarctic Research Centre, including Ph.D. student Lauren Vargo, are tracking those changes using the latest digital modelling techniques.

"We're looking at the [glaciers](#) using aerial photogrammetry, which is a type of aerial photography used to create models of the objects you're photographing," says Vargo.

"This means we can use the method we're developing to measure changes in the glaciers from the photographs we're taking."

Vargo's method has two parts. The first involves using the country's "great database of photos" taken over the past 40 years to measure how the glaciers have changed.

These photos come from the annual end of summer snowline survey supported by the NIWA project 'Climate Present and Past'.

As part of a collaboration between NIWA and Victoria University, Vargo took part in the snowline survey earlier this year along with Dr. Brian Anderson and Dr. Huw Horgan, also from the Antarctic Research Centre.

The Antarctic Research Centre team joined Dr. Andrew Lorrey, the NIWA project leader, and Dr. Trevor Chinn, founder of the snowline survey.

During the survey, scientists photograph the glaciers to see how much snow remains from the previous winter. The less snow that remains, the more the glacier will shrink.

The second part of Vargo's project is using the thousands of photos, both historic and new, to build complex digital models of the glaciers.

"I've taken all the photos from our recent trip to the Southern Alps and put them into software called Structure for Motion," says Vargo.

"This software gives us an orthophoto, which is a mosaic of all the photos we've taken of a glacier that gives us one comprehensive view of the current state of the glacier, as well as a digital elevation [model](#) of the glacier showing whether the ice volume has increased or decreased."

This method will give scientists precise models of glaciers based only on photos. Current methods of glacier measurement involve physically hiking up glaciers, so this method will make glacier measurement easier. It will also make it possible to measure glaciers currently inaccessible by humans, giving accurate data on the changes in glaciers.

"If we can get these models precise and accurate enough, we'll be able to measure changes in ice volume across the entire Southern Alps using only these photographs," says Vargo.

It's still early days yet, but what are these models showing?

"Overall, we're seeing a retreat in almost all the glaciers we've studied," says Vargo.

"Globally, glaciers are one of the largest contributors to [sea level](#) rise and in New Zealand they are tourism icons, and provide water to our major rivers. For these reasons, melting glaciers are a serious problem."

Provided by Victoria University of Wellington

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