Glaciers Disappearing at a Record-setting Pace

Accelerating glacier melt driven by extreme weather events and surface darkening highlights urgent need for improved climate models, says UNBC-led study.

Klinaklini Glacier, located on the central coast of British Columbia and shown here in 2017, is the largest glacier in western North America outside Alaska. But it's melting rapidly, losing about one gigaton of water each year. Photo courtesy of the Hakai Institute.

PRINCE GEORGE, BRITISH COLUMBIA, CANADA, June 25, 2025 /EINPresswire.com/ -- Glaciers in Western Canada and Switzerland experienced the largest mass losses on record over the past four years, according to a new study led by University of Northern British Columbia researcher Dr. Brian Menounos.

The findings, published in the peer-reviewed journal Geophysical Research Letters, reveal an alarming acceleration in glacier melt rates in the regions between 2021 and 2024 – doubling the pace observed in the previous decade.

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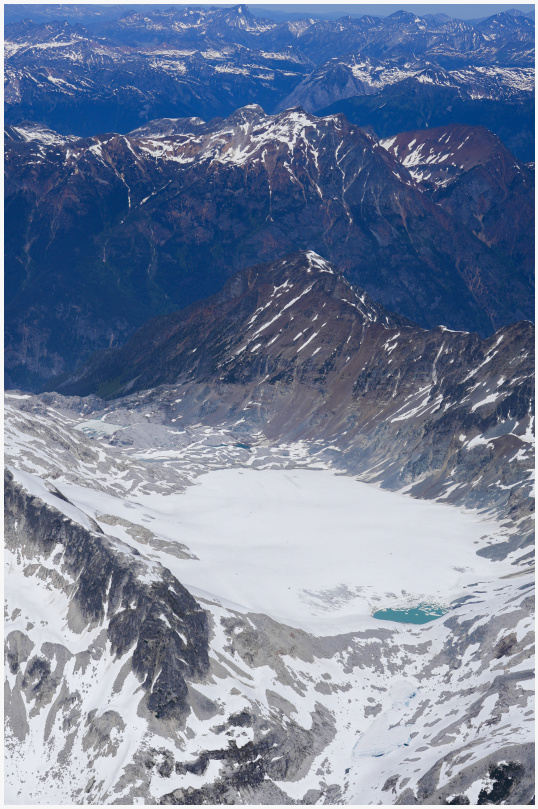
>
> *UNBC researcher Dr. Brian Menounos*

During the four-year span, glaciers in western Canada and the conterminous United States lost approximately 22.2 gigatonnes of ice per year, while Swiss glaciers lost 1.5 gigatonnes annually. Since 2020, total ice volumes declined by 12 per cent and 13 per cent, respectively.

To put the loss in Western North America into perspective, that's enough meltwater to submerge the metropolitan area of Toronto (630 km²) under 35 metres of water each year.

"Even against the backdrop of rapid glacier loss since the start of this century, what we're witnessing now is unprecedented," says Menounos, a Professor in UNBC's Department of Geography, Earth and Environmental Sciences. "The melt rates over the last four years far

exceed anything we've observed in the past six decades, posing serious implications for freshwater availability, increased geohazard risks and the loss of cultural and tourism values tied to mountain landscapes."



Nestled deep in the Coast Mountains of British Columbia, Place Glacier exemplifies a troubling trend: melt zones creeping to higher elevations as snow and ice retreat. Photo courtesy of the Hakai Institute.

With funding from the Tula Foundation and the National Science and Engineering Research Council of Canada, Menounos worked with scientists from the Hakai Institute, Natural Resources Canada (Geological Survey of Canada), Environment and Climate Change Canada, the United States Geological Survey and researchers from Europe. The team used airborne laser altimetry data from the Hakai Airborne Coastal Observatory in addition to other datasets and modeling to calculate the glacier mass loss reported in the study.

In both regions, the researchers identified a combination of factors driving the record losses: low winter snow accumulations, early-season heat waves and prolonged warm, dry conditions.

"We're seeing the effects of meteorological events compounding one another – these conditions rapidly depleted snowpacks, exposing darker glacier ice and firn – multiyear snow - which can absorb more energy from sunlight and further accelerate melting," says Menounos. "We believe these firn and ice surfaces are becoming darker from deposition of ash in Western North America and Saharan dust in Europe. Unfortunately, this darkening provides unhelpful feedback in a warming climate that will allow high melt rates to continue."

Based on projected rates of glacier mass loss to 2060, the study is consistent with previous research suggesting the period of peak glacier runoff – when meltwater contributions to rivers are at their highest - has likely already occurred and streamflow from glaciers will decline in coming decades.

The researchers are advocating for improved, next-generation physical models that better represent the response of glaciers to extreme weather events and processes like surface impurity deposition from dust and wildfires.

"Current global models of glacier change do not include ways to track physical processes which lead to glacier darkening', says Menounos "If we're going to plan for the future, we need to improve our physical models to include these critical feedbacks."

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