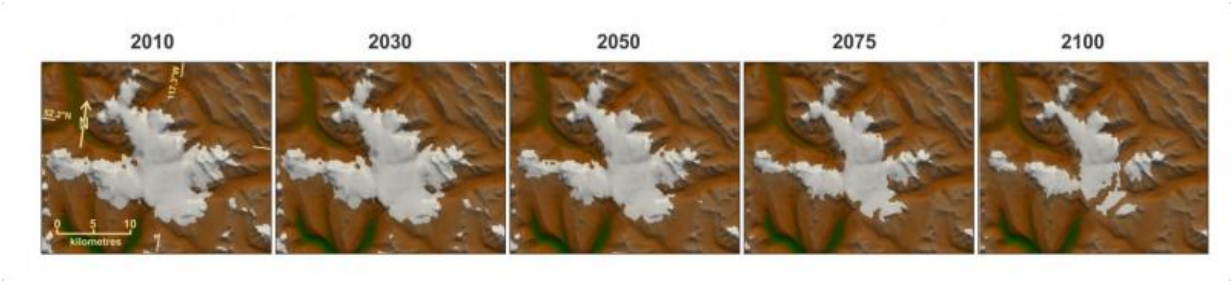
Western Canada to lose 70 percent of glaciers by 2100

April 6 2015



In the Canadian Rocky Mountains, the Columbia Icefield represents an important source of snow and ice melt for the Athabasca, Saskatchewan and Columbia river basins. The Icefield is vital for the tourism industry that operates in Jasper and Banff national parks. Millions of people visit the icefield each year. Shown are the changes in predicted ice extent for a low (peaking at 490 ppm of atmospheric CO2 -equivalent; Fig. 1A) versus high (greater than 1370 ppm of atmospheric CO2 -equivalent; Fig. 1B) emission scenario by the end of the century. The emission scenarios are respectively referred to as RCP2.6 and RCP8.5 in the Intergovernmental Panel on Climate Change Fifth Assessment Report. Credit: University of British Columbia

Seventy per cent of glacier ice in British Columbia and Alberta could disappear by the end of the 21st century, creating major problems for local ecosystems, power supplies, and water quality, according to a new study by University of British Columbia researchers. The study is published online in *Nature Geoscience*.

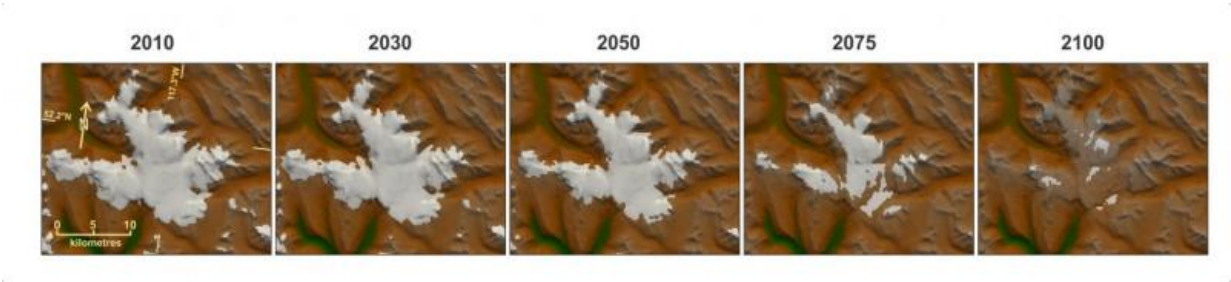
The study found that while warming temperatures are threatening glaciers in Western Canada, not all glaciers are retreating at the same rate. The Rocky Mountains, in the drier interior, could lose up to 90 per cent of its glaciers. The wetter coastal mountains in northwestern B.C. are only expected to lose about half of their glacier volume.

"Most of our ice holdouts at the end of the century will be in the northwest corner of the province," said Garry Clarke, professor emeritus in the Department of Earth, Ocean and Atmospheric Sciences. "Soon our mountains could look like those in Colorado or California and you don't see much ice in those landscapes."

For the study, researchers used observational data, computer models and climate simulations to forecast the fate of individual glaciers.

There are over 17,000 glaciers in B.C. and Alberta and they play an important role in energy production through hydroelectric power. The glaciers also contribute to the water supply and are essential to mining and agriculture. Clarke says while these issues are a concern, increased precipitation due to climate change could help compensate for glacier loss. The greatest impact, he suspects, will be on freshwater ecosystems. During the late summer, glacier melt provides cool, plentiful water to many of the region's headwaters.

"These glaciers act as a thermostat for freshwater ecosystems," said Clarke. "Once the glaciers are gone, the streams will be a lot warmer and this will hugely change fresh water habitat. We could see some unpleasant surprises in terms of salmon productivity."



In the Canadian Rocky Mountains, the Columbia Icefield represents an important source of snow and ice melt for the Athabasca, Saskatchewan and Columbia river basins. The Icefield is vital for the tourism industry that operates in Jasper and Banff national parks. Millions of people visit the icefield each year. Shown are the changes in predicted ice extent for a low (peaking at 490 ppm of atmospheric CO2 -equivalent; Fig. 1A) versus high (greater than 1370 ppm of atmospheric CO2 -equivalent; Fig. 1B) emission scenario by the end of the century. The emission scenarios are respectively referred to as RCP2.6 and RCP8.5 in the Intergovernmental Panel on Climate Change Fifth Assessment Report. Credit: University of British Columbia

Background

Researchers predicted changes in the area and volume of glaciers in western Canada under a range of greenhouse gas emission scenarios used by the Intergovernmental Panel on Climate Change (IPCC) in their most recent assessment of the state of the climate system. Increases in carbon dioxide in the atmosphere, released from fossil fuel combustion, is the primary factor that will cause increases in surface air temperatures in the decades ahead.

Researchers say the impact of climate change on glacier health may not be evident at first sight. While the surface area covered by the glacier may not be changing, the glaciers are thinning at a rate of about one

metre per year.

"Most glaciers are only 100 to 200 metres thick," said Clarke. "They're losing volume but this loss we're seeing right now is a bit hidden."

This study is a collaboration between UBC, the University of Northern British Columbia, the University of Iceland and the Pacific Climate Impacts Consortium.

More information: *Nature Geoscience*, DOI: 10.1038/ngeo2407

Provided by University of British Columbia