

GLOBAL WARNING

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A UVic research team tracks the effects of climate change in Canada's warming Arctic

by Shannon McCallum

Is it possible that the coldest and least inhabited regions on Earth could influence the course of global warming? "Definitely," says an international team of Arctic experts.

UVic geographer Dr. Terry Prowse is a member of this team and one of the lead authors of the Arctic Climate Impacts Assessment, which in April will publish its full scientific report detailing the impacts and consequences of climate change in the Arctic.

Climate scientists agree that without any reductions in greenhouse gas emissions, the Earth's surface temperature is projected to rise about three degrees Celsius by the year 2100. This warming won't be uniform. Some regions could undergo slight cooling, but the Arctic will likely see drastic warming two or three times the global average.

The potential impacts on the Arctic—some of which are already

occurring—are severe. And the consequences will be felt worldwide, warns Prowse.

"The changes will quicken the pace of global warming and intensify its impacts throughout the world. Not only will melting sea ice and glaciers increase global sea levels, but shrinking areas of reflective ice and snow will lead to more sunlight being absorbed by the exposed water and land, further heating up the planet."

Prowse is a hydrologist who studies cold, freshwater systems. He holds the research chair in climate impacts on water resources, based in UVic's geography department. He also heads the Water and Climate Impacts Research Centre (W-CIRC), jointly sponsored by UVic and Environment Canada. The centre conducts interdisciplinary research on the impact of climate on Canadian and global water resources.

The Arctic is a major study area for Prowse and his research team. "The Arctic is our canary in the coal mine,"

he says. "Since the Arctic is warming faster than the rest of the globe it makes sense to look there for the earliest signs of climate change."

To keep an eye on these changes, Prowse has enlisted UVic graduate student Megan Thompson to work on the Distant Early Warning (DEW) Line for climate change, an Environment Canada-funded project that will monitor 22 lakes across the Canadian Arctic.

The team will track changes in temperature, nutrient availability, water budgets and lake ecosystems, creating a permanent record of how the lakes respond to changes in the regional environment.

The DEW Line is a first for Canada and will provide valuable insights into how northern ecosystems and water resources react to environmental stresses such as pipeline construction, dam-building and, of course, climate change.

"This is frontier science," says Prowse. "We really don't know

what the effects of climate change on these systems will be, but we know they'll be important."

This article was written by Shannon McCallum, a student in the faculty of graduate studies, as a participant in the UVic SPARK program (Students Promoting Awareness of Research Knowledge).



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UVic science and engineering researchers lead all comprehensive universities in Canada in size and number of science and medical grants per faculty member.

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Among the key findings of the Arctic Climate Impacts Assessment:

- The Arctic climate is now warming rapidly and much larger changes are projected
- Arctic warming and its consequences have worldwide implications
- Multiple influences will alter Arctic ecosystems, pushing some species toward extinction
- Indigenous communities in the Arctic will face major economic and cultural impacts.

Loss of snow and freshwater ice will produce major changes in the ecological health of Arctic lakes and rivers. It will also affect global climate, biological diversity and the dispersal of contaminants originating from southern latitudes.

Loss of sea ice could provide economic benefits by making the Arctic's marine resources, such as oil and gas, more accessible. But the benefits could be outweighed by environmental damage resulting from resource extraction and shipping.

The Water and Climate Impacts Research Centre (W-CIRC) places UVic in the forefront of climate and water-related research in Canada. It complements the work of UVic's climate modelling lab, which studies past, present and future climates, and the university's water and watershed research program, which conducts research related to ecosystem and human health, fisheries, agriculture, climate and pollution.

For more information on W-CIRC visit office.geog.uvic.ca/w-circ.

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▲ Prowse, right, with Thompson and some of their Arctic research gear.

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