

THE Science OF Storms

It's very Canadian to talk about the weather, particularly during a summer like 2009. While Ottawans pumped out flooded basements for the third time in 15 years and Prairie farmers suffered through the second major drought in a decade, the Arctic Sea ice continued to melt at an alarming rate. Are weather patterns changing? Will too many weather disasters threaten our health, economy, security or way of life? Unfortunately, we don't really know.

In 2000, the federal government created the Canadian Foundation for Climate and Atmospheric Sciences (CFCAS) to help answer these critical questions. New knowledge is emerging from hundreds of university studies into climate and weather conducted across Canada. It is the hope that it will help improve our understanding of, and adaption to, a changing world.

Some of this research is being conducted here in Ottawa. Dr. Peter Lafleur of Trent University is measuring how carbon dioxide, a key greenhouse gas, is absorbed and released from the Mer Bleue bog off Anderson Road. Additionally, Booth Street's Natural Resources Canada is storing ice-core samples from the far north as part of a study tracking past climates to predict future conditions.

One of the most important CFCAS-funded studies are those focusing on the north, which covers almost half of Canada's landmass. The north is home to 100,000 people and is of huge economic and strategic importance. The Arctic is also the "miner's canary" of global change, foretelling what the rest of Canada and the world can expect to experience.

Over the past few decades, melting sea ice and extreme weather have affected northern dwellers, wildlife, water and vegetation to an extent unparalleled in recent history. Will northern communities survive climate change? Will coastal communities be flooded as ice melts? Will the northern climate continue to sustain traditional lifestyles and diets? Not only are indigenous foods important culturally and socially, but they are also often nutritionally superior to imported foods. Changes to existing weather



Professor Peter Lafleur explains how carbon dioxide is measured at the Mer Bleue bog, Ottawa



Monitoring Storms on Baffin Island

patterns therefore affect northerners' health and well-being. And the impact is broader than on just the hunting, fishing and gathering communities, as the traditional way of life indirectly supports the many who live in towns or villages.

Among the major CFCAS-funded northern studies are those conducted by the Storm Studies in the Arctic—or STAR—network, under Dr. John Hanesiak of the University of Manitoba. Through a better understanding of northern storms and related hazards in the Iqaluit area, his team is hoping to help improve safety for northern communities.

Other CFCAS-funded researchers, like Dr. Gordon McBean at the University of Western Ontario, are also investigating northern storms and how communities could better integrate traditional knowledge and modern forecasting methods. Dr. David Barber at the University of Manitoba is looking at how sea ice behaves over time, including how it affects the frequency and intensity of northern storms.

Based at the University of Ottawa, Dr. Antoni Lewkowicz's northern

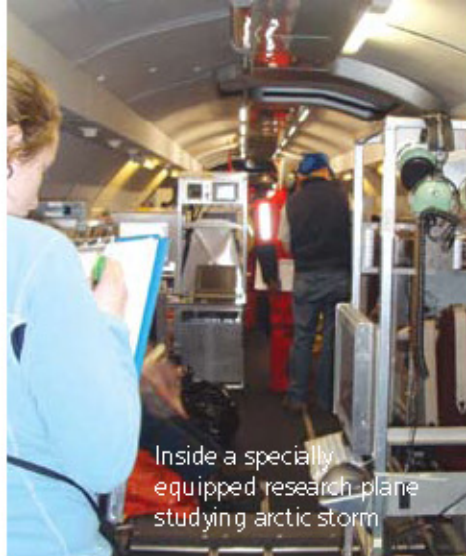
research is leading to more detailed permafrost probability maps. Permafrost is the only form of frozen ground that supports year-round habitation and it underlies about half of Canada's landmass. As permafrost melts, communities and structures are threatened. Dr. Lewkowicz's research is already proving helpful to northern community planners, who use his information to plan roads, railways, buildings and airstrips in safer locations.

Another CFCAS-funded researcher studies rivers from the Rocky Mountains and northern forests, which all flow north towards the Arctic. Dr. John Pomeroy of the University of Saskatchewan is trying to understand why these flows have declined 12 percent over the last century and why Arctic precipitation is up eight percent. He hopes to learn more about stream flows, freezing, ice break-up, and the timing and severity of floods. One reason for these changes, observes Dr. Pomeroy, is that glaciers are melting at the headwaters of Arctic rivers. But our current models cannot explain the rates of decay. His information will be essential to communities near waterways and those who depend on rivers for their food or livelihood.

Canadian Network for the Detection of Atmospheric Change (CANDAC) uses a unique research laboratory on Ellesmere Island, 1,000 kms from the North Pole, to study the Arctic atmosphere. There, a team led by Dr.

James Drummond of Dalhousie University is using satellite and land instruments to learn more about how climate change is affecting the protective Arctic ozone layer.

Thanks to knowledge generated with CFCAS support, we'll be in a better position to adapt to and manage the broad impacts of climate change, to benefit from the opportunities it presents, and to anticipate the kind of world we are leaving our children. ■



Inside a specially equipped research plane studying arctic storm

PHOTO: S. FARGY/CFCAS

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