UVIC KNOWLEDGE
Research and discovery at the University of Victoria
VOL 16 NO 6 JUNE 2016

EXTREME THINKING

Zwiers. PHOTO BY UVIC PHOTO SERVICES

Science is closer to linking some weather-related disasters to human-caused climate change

by Patty Pitts

Whenever a weather-related disaster happens—such as the Fort McMurray wildfires and the Calgary floods—climate researchers are inevitably asked the same question: was this event caused by climate change?

It's a fair question, given the devastation and escalating cost of these events—$5.6 billion in losses for the Calgary floods alone—and their rising global frequency.

"Scientists feel compelled to comment when an extreme event occurs," says Francis Zwiers, a climate statistician and director of the University of Victoria's Pacific Climate Impacts Consortium (PCIC), "but providing definitive answers often requires more time and research than is available during today's rapid news cycles."

However, science is increasingly catching up. This spring, a US National Academy of Sciences committee—on which Zwiers served—released a milestone report acknowledging that progress is being made on attributing some extreme events to climate change caused by human activity.

One approach is to use weather data and computer models to estimate and compare the odds of the event under current conditions and under conditions with lower pre-industrial greenhouse gas levels.

"We have more confidence in temperature records than just about any other kind of data," says Zwiers, who says science can now positively link the increasing frequency of heatwaves to human influence on the climate. He estimates that more than half the global population will regularly experience historically hot summers within 20 years.

Scientists are also learning more about the water cycle and climate change. Current PCIC research uses hydrological models to determine how the warming climate is shrinking snowpacks in BC's mountains.

Warmer winters mean that more precipitation falls as rain or melts during winter thaws, often resulting in smaller snowpacks than in the past, explains Zwiers. Less water is then stored naturally to support summer streamflow to rivers, affecting water supplies along the way.

Another example is Canada's iconic Arctic, where the rapidly changing climate is affecting the land, the ocean and ecosystems. Zwiers and colleagues are using "event attribution" research techniques and climate models to study the loss of Arctic sea ice.

"New record lows in summer and in winter sea-ice coverage have been set in recent years," he says. "Our research suggests that record low summer sea-ice coverage such as that seen in 2012 would have been impossible in the pre-industrial world."

Growing awareness of the impacts of climate change is altering how PCIC—a regional service centre that provides high-quality information on the regional effects of climate change—delivers its research results to BC stakeholders.

Rather than handing over finished reports for others to use, PCIC now often works in a facilitating role, providing organizations and communities with the climate data needed to do their own analyses and subsequently offering expertise to review the resulting reports.

"Although there's still considerable uncertainty about the effects of climate change on many types of extreme events, we can now often provide information about changing extremes that's useful for community adaptation planning and decision-making," says Zwiers.

"Long-lived infrastructure—from bridges and wharves to highways and storm drains—is particularly vulnerable to extreme weather events. Advanced planning based on sound scientific outcomes is essential to help us prepare for the changes ahead."

EDGEWISE

The Pacific Climate Impacts Consortium (PCIC) is a not-for-profit corporation that provides practical, science-based information on the regional impacts of climate change for policy action in the areas of community planning, ecology, forestry, hydrology, transportation, agriculture, public health and energy. PCIC is owned by UVic and supported financially by its users.

PCIC helps users of climate information in BC to better understand the implications of climate change so that they can adapt effectively. It's made up of representatives from university and government research labs and industry, including stakeholders and partners from BC and Washington State.

The PCIC Data Portal gives the public access to weather observations from more than 6,700 locations around the province. The data dates from the present to as far back as 1870. In the last year alone, PCIC added 24 million observations from around the province into the database. Visit *bit.ly/uvic-data-portal*

PCIC works closely with the Pacific Institute for Climate Solutions, a knowledge network hosted and led by UVic that brings together researchers from around BC and the world to study climate change and develop positive approaches to mitigation and adaptation. Visit *pics.uvic.ca*

Meet Francis Zwiers at *bit.ly/uvic-zwiers*