

# **EARTH OBSERVATORY, NASA**

## **Impact of Arctic Heat Wave Stuns Climate Change Researchers**

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Unprecedented warm temperatures in the High Arctic this past summer were so extreme that researchers with a Queen's University-led climate change project have begun revising their forecasts.

"Everything has changed dramatically in the watershed we observed," reports Geography professor Scott Lamoureux, the leader of an International Polar Year project announced yesterday in Nunavut by Indian and Northern Affairs Minister Chuck Strahl. "It's something we'd envisioned for the future – but to see it happening now is quite remarkable."

One of 44 Canadian research initiatives to receive a total of \$100 million (IPY) research funding from the federal government, Dr. Lamoureux's new four-year project on remote Melville Island in the northwest Arctic brings together scientists and educators from three Canadian universities and the territory of Nunavut. They are studying how the amount of water will vary as climate changes, and how that affects the water quality and ecosystem sustainability of plants and animals that depend on it.

The information will be key to improving models for predicting future climate change in the High Arctic, which is critical to the everyday living conditions of people living there, especially through the lakes and rivers where they obtain their drinking water.

Other members of the research team include, from the Queen's Geography Department: Paul Treitz, Melissa Lafreniere and Neal Scott; Myrna Simpson and Andre Simpson from U of T; and Pierre Francus from INRS-ETE, Quebec. Linda Lamoureux of Kingston's Martello School will work with the scientists to develop learning tools for schools in the north.

From their camp on Melville Island last July, where they recorded air temperatures over 20°C (in an area with July temperatures that average 5°C), the team watched in amazement as water from melting permafrost a meter below ground lubricated the topsoil, causing it to slide down slopes, clearing everything in its path and thrusting up ridges at the valley bottom "that piled up like a rug," says Dr. Lamoureux, an expert in hydro-climatic variability and landscape processes. "The landscape was being torn to pieces, literally before our eyes. A major river was dammed by a slide along a 200-metre length of the channel. River flow will be changed for years, if not decades to come."

Comparing this summer's observations against aerial photos dating back to the 1950s, and the team's monitoring of the area for the past five years, the research leader calls the present conditions "unprecedented" in scope and activity. What's most interesting, he says, is that their findings represent the impact of just one exceptional summer.

"A considerable amount of vegetation has been disturbed and we observed a sharp rise in erosion and a change in sediment load in the river," Dr. Lamoureux notes. "With warmer conditions and greater thaw depth predicted, the cumulative effect of this happening year after year could create huge problems for both the aquatic and land populations. This kind of disturbance also has important consequences for existing and future infrastructure in the region, like roads, pipelines and air strips."

If this were to occur in more inhabited parts of Canada, it would be "catastrophic" in terms of land use and resources, he continues. "It would be like taking an area the size of Kingston and having 15 per cent of it disappear into Lake Ontario."

The Queen's-led project is working with other IPY research groups including: Arctic HYDRA, an international group investigating the impact of climate change on water in the Arctic; Science Pub, a Norwegian group working on broad research from science to public education about the impacts of global warming; and CiCAT, a University of British Columbia-led group of 48 researchers investigating the impacts of climate change on tundra vegetation.

International Polar Year (IPY) is the largest-ever international program of coordinated scientific research focused on the Arctic and Antarctic regions and the first in 50 years.