RESEARCH SPOTLIGHT

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Canada's subarctic lakes could face widespread desiccation

In Canada's subarctic—the boreal ecosystem that spans most of mainland Canada—the temperature is climbing, and the snowpack is thinning. Previous research has shown that snow is disappearing even faster than sea ice.

Researchers are concerned that the decline in snow cover will spell the end of many of the country's abundant subarctic lakes and the unique ecosystems they support. These worries are supported by recent observations that showed subarctic lakes drying out. To assess the susceptibility of subarctic lakes to widespread desiccation, *Bouchard et al.* spent years monitoring changes in subarctic lakes. They found that many subarctic lakes are sensitive to changes in snowmelt and that recent bouts of drying may be unprecedented in the past 200 years.

The Old Crow Flats and the Hudson Bay Lowlands, the sites of the authors' investigation, are two of the largest subarctic lake-rich ecosystems in North America. Permafrost and silt- and clay-rich soils prevent water from seeping through the ground, creating landscapes covered with thousands of shallow thermokarst lakes.

With little water moving through the ecosystem other than that which flows overland, the authors found that the stability of these subarctic lakes depends crucially on winter snowfall and spring snowmelt. They found that lakes in regions with flat terrain and sparse vegetation are most susceptible to evaporative lake-level drawdown at times when snowmelt runoff is low. If current trends continue, the researchers say, many of these small snow-fed tundra lakes could disappear within the next few years to decades. (*Geophysical Research Letters,* doi:10.1002/2013GL058635, 2013) —CS

Hilary White

Desiccated lakes in Wapusk National Park in the Hudson Bay Lowlands near Churchill, northern Manitoba, Canada.

C. Read/AVO/USGS

Augustine Volcano during March 2006.

Migrating quake swarm may indicate magma conduit clog

On 13 January 2006, Augustine Volcano, a towering volcano offshore from the Alaska Peninsula, erupted explosively. In the days leading up to the eruption, a series of explosions and earthquake swarms had warned of the impending activity. On 12 January, 36 hours before the first magmatic explosions, a swarm of 54 earthquakes was detected across the 13-station seismic network on Augustine Island. Analyzing the seismic waves produced by the earthquakes, *Buurman and West* found that the earthquakes were being triggered from point sources within the magma conduit itself.

Using seismic wave observations, the authors found that over the course of the 2-hour earthquake swarm, the earthquakes' hypocenters moved 35 meters deeper into the magma conduit. This progressive deepening, the authors suggest, could have been an indication that the magma conduit was becoming clogged. This block to magma extrusion would have led to a buildup of pressure and may have contributed to the explosive eruption the next day.

Augustine is a stratovolcano, a type of volcano where eruptions can often bring dangerous pyroclastic flows. The authors hope that the detection of subtle shifts in the hypocenters of swarming earthquakes could help improve the predictability of an impending eruption. (*Geophysical Research Letters,* doi:10.1002/2013GL057864, 2013) —CS

—Colin Schultz, Writer