Baffin Island ice caps shrink by 50 percent since 1950s, study

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Ice caps on the northern plateau of Baffin Island in the Canadian Arctic have shrunk by 50 percent in recent decades as a result of warming temperatures. Credit: Gifford Miller, University of Colorado at Boulder

A new University of Colorado at Boulder study has shown that ice caps on the northern plateau of Baffin Island in the Canadian Arctic have shrunk by more than 50 percent in the last half century as a result of warming, and are expected to disappear by the middle of the century.

Radiocarbon dating of dead plant material emerging from beneath the receding ice margins show the Baffin Island ice caps are now smaller in area than at any time in at least the last 1,600 years, said geological sciences Professor Gifford Miller of CU-Boulder's Institute of Arctic

and Alpine Research. "Even with no additional warming, our study indicates these ice caps will be gone in 50 years or less," he said.

The study also showed two distinct bursts of Baffin Island ice-cap growth commencing about 1280 A.D. and 1450 A.D., each coinciding with ice-core records of increases in stratospheric aerosols tied to major tropical volcanic eruptions, Miller said. The unexpected findings "provide tantalizing evidence that the eruptions were the trigger for the Little Ice Age," a period of Northern Hemisphere cooling that lasted from roughly 1250 to 1850, he said.

A paper on the subject was published online in *Geophysical Research Letters* and featured in the Jan. 28 edition of the American Geophysical Union journal highlights. Authors on the study included Miller, graduate students Rebecca Anderson and Stephen DeVogel of INSTAAR, Jason Briner of the State University of New York at Buffalo and Nathaniel Lifton of the University of Arizona.

Located just west of Greenland, the 196,000 square-mile Baffin Island is the fifth largest island in the world. Most of it lies above the Arctic Circle.

The researchers also used satellite data and aerial photos beginning in 1949 to document the shrinkage of more than 20 ice caps on the northern plateau of Baffin Island, which are up to 4 miles long, generally less than 100 yards thick and frozen to their beds. "The ice is so cold and thin that it doesn't flow, so the ancient landscape on which they formed is preserved pretty much intact," said Miller.

In addition to carbon-dating plant material from the ice edges, the researchers extracted and analyzed carbon 14 that formed inside the Baffin Island rocks as a result of ongoing cosmic radiation bombardment, revealing the amount of time the rocks have been

exposed, he said. The analysis of carbon 14 in quartz crystals indicated that for several thousand years prior to the last century, there had been more ice cover on Baffin Island, Miller said.

The increase of ice extent across the Arctic in recent millennia is thought to be due in large part to decreasing summer solar radiation there as a result of a long-term, cyclic wobble in Earth's axis, said Miller. "This makes the recent ice-cap reduction on Baffin Island even more striking," he said.

Funded primarily by the National Science Foundation, the study is among the first to use radiocarbon samples from rocks for dating purposes, Miller said. The radiocarbon portion of the study was conducted at INSTAAR and the University of Arizona.

Temperatures across the Arctic have been rising substantially in recent decades as a result of the build up of greenhouse gases in Earth's atmosphere. Studies by CU-Boulder researchers in Greenland indicate temperatures on the ice sheet have climbed 7 degrees Fahrenheit since 1991.

Source: University of Colorado at Boulder