Ancient ice sheet may have melted later than previously thought

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William Philipps, a UB geology graduate researcher, examines Greenland's terrain as part of research on deglaciation and global climate change. Credit: Jason Briner

After one of the snowiest winters in recent history, William Philipps will forego the beach to spend the summer studying glaciers at the world's northernmost university.

The University at Buffalo geology graduate student and self-proclaimed "nerd who likes rocks" will travel to the University Centre on Svalbard (UNIS) in Norway to collect data that proves the Svalbard-Barents Sea Ice-Sheet's (SBSIS) time of deglaciation – the point when the ice began to melt – is older than its suggested age of 12,000 years.

Philipps, an Amherst native, will travel to Svalbard on July 12 through the UNIS's Icebound Project, funded by the ConocoPhillips and Lundin Petroleum arctic research program, which seeks to improve understanding of the region for petroleum exploration. He will spend three months completing a mix of courses and research on global climate change.

The Norwegian archipelago of Svalbard is not the average study abroad or research experience. Philipps will visit during the region's midnight sun season, a period when the sun is visible 24 hours a day. He will also undergo survival training that includes strapping on an insulated suit and learning to withstand the chilly artic water.

Fortunately, Philipps is familiar with the experience. A member of the paleoclimatology research group under Jason Briner, PhD, associate professor in the UB Department of Geology in the UB College of Arts and Sciences, he conducted similar research in Greenland as an undergraduate.

William Philipps' research in Svalbard will increase the understanding of the glacier's behavior and may help predict the future behavior of the West Antarctic Ice Sheet.

"I am incredibly fortunate to be where I am in life," says Philipps. "I get to work in the most breathtaking settings in the world on complex scientific problems and learn from some of the foremost research scientists in my field."

At their maximum extent, as long ago as 25,000 years ago, the SBSIS and other ice sheets – some over a mile thick – engulfed the northern hemisphere. But over time, the ice eroded, transporting pieces of rock, known as glacial erratics, up to hundreds of miles into different geologic areas.

Once the ice melted, the rocks were exposed to the sun and bombarded with cosmic radiation, causing a nuclear chemical reaction that produces beryllium. Through cosmogenic exposure dating, researchers measure the ratios of beryllium to determine the time of deglaciation.

The material used to date the SBSIS's deglaciation were pieces of driftwood found on Kongsøya and Hopen, two of Svalbard's eastern most islands. However, the conditions for the wood to be deposited on the islands indicate that the time between the ice beginning to drift and when the wood was deposited may be thousands of years off, says Philipps.

After collecting samples from several locations that are fractions of a gram in weight and about the size of a pinhead, the researchers will send the erratics to a mass spectrometer facility to measure their age.

The study's results will increase the understanding of the SBSIS's behavior and can potentially help predict the future behavior of the West Antarctic Ice Sheet.

Determining the age of the erratics will also improve constraints of glacial isostatic adjustment (GIA) values for the region, which detail the rise of land masses that were suppressed by the weight of ice sheets during a glacial period, says Philipps.

Provided by University at Buffalo

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