

'Supra-glacial lakes' are the focus of a new Penn State study

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Image of subglacial lake in the midst of the ice. Photo: Derrick Lampkin, Penn State

(PhysOrg.com) -- Rising temperatures on the Greenland ice sheet cause the creation of large surface lakes called supra-glacial lakes. Now a Penn State geographer will investigate why these lakes form and their implications.

NASA awarded Derrick Lampkin, assistant professor of geography, almost \$300,000 over three years to look at these lakes.

"Learning where lakes are, how they form, and how that changes through the melt season can help us really understand a lot about important processes that control how the Greenland ice sheet responds to warming," Lampkin said.

Supra-glacial lakes form when melting water collects in pools in the lower levels of the ice sheet in melt or ablation zones. These lakes drain rapidly through cracks in the ice channeling water to beneath the ice sheet, affecting how ice sheets move and how pieces calve off into the ocean.

Researchers assumed that the influence of basal structure -- the structure under the ice at the base -- controls where lakes form on the surface, but the magnitude and degree of this influence are not well known, according to Lampkin. It is important to determine how surface processes and basal conditions interact to shape the [ice sheet](#) topography.

Lampkin's work will complement other research by glaciologists at Penn State, such as Richard Alley and Sridhar Anandakrishan, in understanding how ice sheets work and contribute to [sea level](#). He will look at a variety of existing information, including altimeter data, to create [surface topography](#). He will model the temperatures under the ice and, using existing ice-penetrating radar data, create the basal topography. He will also look at ten years worth of high-resolution LandSat images to map lake features.

"This is an exciting time for the study of the world of ice, but unfortunately the public is not always aware of why this type of work is important," Lampkin said.

In an effort to involve the public in the investigation of ice sheets, Lampkin has proposed an outreach program to create Facebook and iPhone applications that will allow users to map the locations of supra-glacial lakes using high-resolution satellite imagery.

The Facebook and iPhone applications will present users with pre-selected satellite imagery and a tutorial on how to spot the supra-glacial lakes. Lampkin said users who map the locations could receive some sort of incentive through points or rewards for another Facebook game.

According to Lampkin, it is important to track the development of the supra-glacial lakes, because they form and drain quickly. More people mapping these lakes will give researchers more data to learn about them. In addition, if members of the public are able to map the lakes, they might feel they have a personal stake in the study of climate change science.

"The more the public is involved and informed, the more they will understand how climate science is conducted and may be more willing to support these research efforts," he said. Additionally, participation of this type may be the very spark to encourage a young mind to one day become an ice scientist.

Provided by Pennsylvania State University

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