

Greenland's ice sheet plumbing system revealed

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Pioneering new research sheds light on the impact of climate change on subglacial lakes found under the Greenland ice sheet.

A team of experts, led by Dr Steven Palmer from the University of Exeter, has studied the water flow paths from one such subglacial lake, which drained beneath the [ice sheet](#) in 2011.

The study shows, for the first time, how water drained from the lake - via a subglacial tunnel. Significantly, the authors present satellite observations that show that a similar event happened in 1995, suggesting that this lake fills and drains periodically.

The study, called Subglacial lake drainage detected beneath the Greenland Ice Sheet is published in the journal *Nature Communications*.

Lead author Dr Steven Palmer, from Geography at the University of Exeter, said: "Our research reveals details about the plumbing system beneath the Greenland ice sheet, which is important because the configuration of that system has an impact on the flow speed of the overlying ice."

Although the ice sheet response to draining subglacial lakes has previously been observed in Antarctica, this is the first time that a similar phenomenon has been observed in Greenland.

However, unlike Antarctic subglacial lakes, which are sustained through

melting of the ice sheet base, the study shows that this subglacial lake has been fed by surface meltwater flowing down a nearby moulin - a circular, vertical shaft found within a glacier.

The scientists predict that as the Arctic continues to warm, increasing volumes of surface meltwater routed to the ice sheet bed will cause subglacial lake drainage to become more common in the future. Because the way in which water moves beneath ice sheets strongly affects ice flow speeds, this increased drainage frequency could affect the sensitivity of the ice sheet to climate change, impacting the rate of future sea level change.

Dr Palmer added: "We have made the first observations of how the Greenland ice sheet responds to subglacial lake drainage, but more research is required to understand the long-term impacts of these events. It is possible that draining subglacial lakes act to release the pressure at the ice sheet base, meaning that if they drain more frequently in the future, they may actually result in slower ice sheet flow overall".

Provided by University of Exeter

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