

Drilling 613 m through Muller's Ice Cap, Arctic Canada - advances in drill equipment and camp infrastructure

Tuesday 16 September 2025 12:25 (20 minutes)

From late March to late May 2025, a collaboration between Canada and Denmark drilled a 613m ice core through the Muller ice cap in the high Canadian Arctic. It is the deepest ice core in the Americas to date. The ice cap is in close proximity to the Arctic Ocean, supporting the primary goal of understanding the evolution of Arctic sea ice over the 10,000+ year record contained within the ice.

We will discuss several novel solutions that were implemented, as well as lessons learned and statistics for projects (with a similar scale) in the future.

For the drilling, we used a newly designed intermediate winch and control system, with a previously existing tower, and the Danish deep drill system with 2.2 m core barrels. The newly designed winch is staged on a movable platform, resulting in a fixed level wind and a short distance to the tower.

Furthermore, we tested an inflatable tent to host the drilling and core processing. This worked well and withstood multiple strong wind days with gusts above 40kt. The tent was a fraction of the weight of a traditional steel-framed tent.

Drilling concluded after 30 drilling days with 10 m of debris-rich / silty ice by hitting bedrock at 612.98m depth.

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Session Classification: Oral sessions

Track Classification: Mechanical Ice drilling