



## **Spatial Patterns of Snow Accumulation across Belcher Glacier, Devon Island, Nunavut, Canada**

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This study describes results from measurements of variations in snow accumulation across Belcher Glacier, Devon Ice Cap. Profiles from a 500 MHz GPR system are validated with avalanche probe, neutron probe (density) and visual core stratigraphy to show how snow accumulation varies spatially across the Belcher Glacier basin. This enables quantification of the annual accumulation rate for 2007-8, and the spatial variability in accumulation since 1963 via the identification of a highly radioactive nuclear fallout layer in gamma spectrometry measurements. Spatial variability in snow accumulation rates at the decimeter scale can be evaluated using the 500 MHz GPR results to image the subsurface to a depth of  $\sim 15$  m. A combination of stratigraphic analysis of 10 shallow ( $< 15$  m) boreholes (separated by distances of 1 – 10 km) with high frequency GPR profiles, enables the extrapolation of point snow accumulation information from the boreholes across the entire spatial extent of the Belcher Glacier accumulation area.

This study will allow the mapping and quantification of spatial and temporal variability in snow accumulation, which is a crucial input for glacier modeling in the GLACIODYN project. This study will also help determine the causes of spatial variations in accumulation such as the influence of different moisture sources, or topographic forcings.