

## Tere Tipako Tio Rapid Ice Sampling Aotearoa

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Current ice sheet evolution models have a very simple representation of glacial ice, and it is difficult to improve on this as there are a limited number of physical property measurements of glacial ice samples, particularly from locations where ice dynamics are important such as fast flowing ice and shear margins. To address this issue, we need samples that represent critical distinct ice bodies: requiring faster sample recovery from a range of depths. The key objective of the Tere Tipako Tio project is to assess the potential of a new method of rapid ice sampling for physical property analysis. The approach is based around hot water drilling for rapid access and was developed and tested on the McMurdo Ice Shelf, Antarctica. Access boreholes were hot water drilled with a minimum diameter of 125 mm. The borehole melt water and drilling water were bailed from the borehole using a series of systems including: a downhole pump, bailing buckets, and a self-contained battery powered bailer. Any minimal water remaining the borehole was left to freeze overnight before deploying specially designed ice sampling tools. Two prototype sampling tools were designed, built and tested: (1) A bottom hole core sampler, and (2) A sidewall core sampler. This hot water drilling method in conjunction with the bottom hole ice sampler prototype was successful at collecting 10 samples at depths of interest in three boreholes over a 10-day period.

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