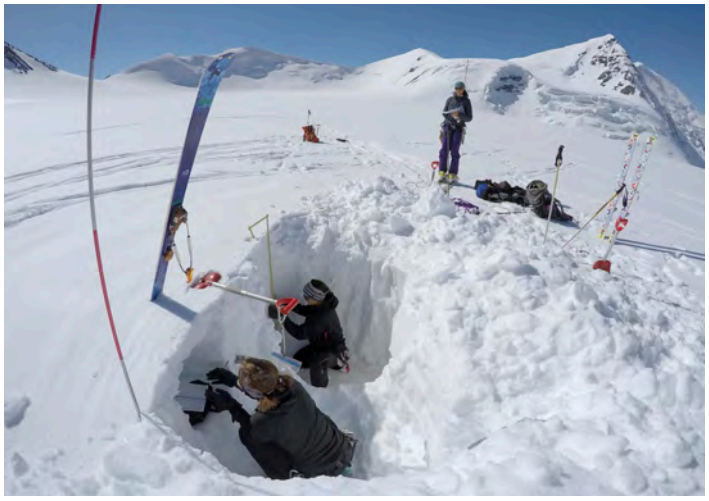
MEASURING & MODELLING WINTER SNOW ACCUMULATION

SFU GLACIOLOGY



Winter snowfall nourishes the glaciers and icefields each winter, competing with summer melt to determine overall glacier health.

HOW MUCH SNOW FALLS ACROSS THE GLACIERS OF KLUANE?

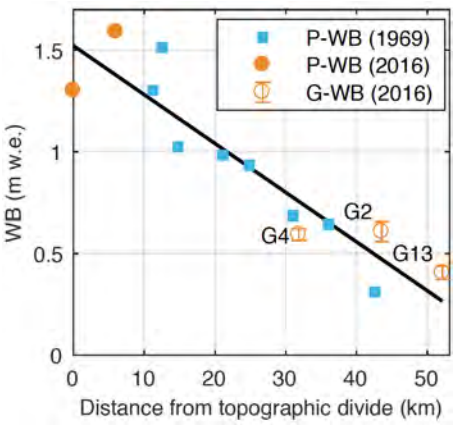
Accumulation, or winter snowfall, forms the positive half of the glacier "mass balance" equation. The other half is summer melt, and melt is currently winning. To understand how and why glaciers gain or lose mass, it is important to understand both winter accumulation and summer melt.

In spring 2016, an all-female team of researchers from Simon Fraser University spent two weeks making over 9000 measurements of snow depth and density across three glaciers in the Donjek Range of Kluane. They used avalanche probes to measure snow depth, and snow pits (above) to measure snow density. By combining these measurements, they calculated the mass of snow that accumulated over the winter season at each site.

The result was equivalent to a 30-60 cm layer of water covering the three study glaciers, much less than the usual summer melt. There is much less snow on the fringes of the icefields (photo, upper left) than deep within the icefields (photo, upper right), consistent with a regional trend of diminishing accumulation with distance from the highest topography (figure at right).

Computer models were used to understand the observed snow distributions and they point to elevation and wind speed/direction as key controls on accumulation. These models are now being used to optimize the design of future snow surveys.

We thank the Kluane First Nation, Parks Canada and Yukon Government for access, and NSERC, NSTP and SFU for funding.



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Full reference: Pulwicki, A., G. E. Flowers, V. Radić, D. Bingham. Accepted. Uncertainties in estimating winter balance from direct measurements of snow depth and density on alpine glaciers, *Journal of Glaciology*.