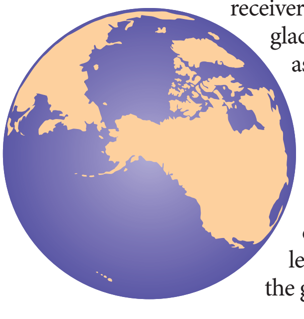
Midnight glacier hikes

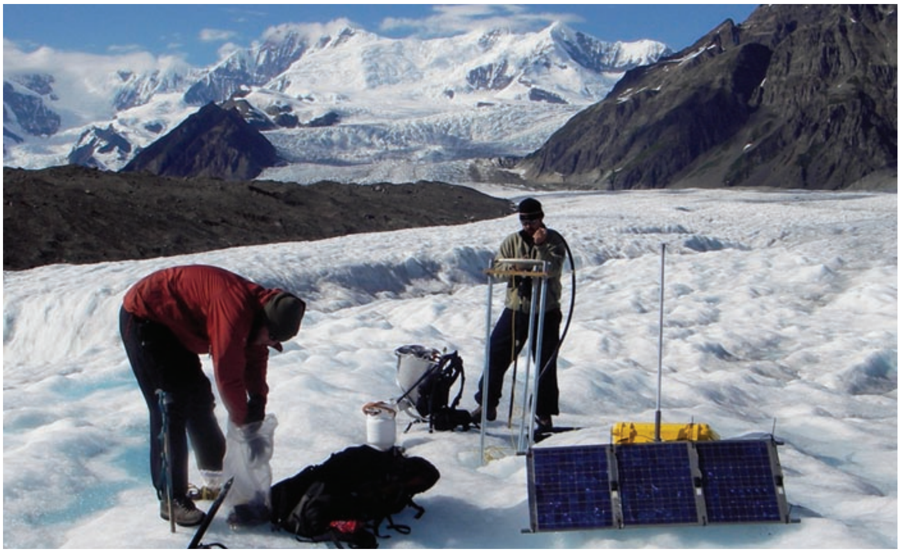
Tim Bartholomaus and Suzanne and Bob Anderson hauled 25 kilograms of equipment over 25 kilometres in 25 hours to get a handle on glacier flow — without breaking the bank.

What was the objective of the work?
Glaciologists and geomorphologists are always looking for the best natural experiments to study the processes acting to shape a landscape. Glacier sliding is key to erosion at the glacier bed. In Kennicott Glacier, Alaska, we found an ideal natural experiment to probe the role of glacier hydrology in setting basal motion.

Why did you choose this particular location for the fieldwork?
Kennicott Valley has been studied since copper-mining days a century ago, when annual outburst floods from the glacier-dammed Hidden Creek Lake damaged the railroad. Suzanne was a member of a 1999–2000 research team that took advantage of this regularity to investigate an outburst flood in action. The survey of the ice dam included two poles on the main glacier, well away from the lake, which showed an acceleration of glacier flow during the flood. This evidence of a large signal in the ice dynamics sent us back to the Kennicott — together with the excellent logistical support available in the town of McCarthy, comprising a house to stay in, a steel footbridge across the 80-m-wide outlet river, support from the Wrangell Mountains Center (a home-grown non-profit educational institute), and the hospitality of former McCarthy resident and remarkable scientist Ed LaChapelle.

What sorts of data or samples were you after?
Hidden Creek Lake would, in a sense, run the natural experiment. We wanted to collect as many data on glacier motion and hydrology as possible with our team of two to four field scientists. We obtained measurements from five global positioning system (GPS) receivers mounted on the glacier surface, as well as from ablation poles drilled into the ice, a gauge installed over the Kennicott River, water samples for chemistry and lake levels in basins along the glacier margin.





Jimmy Vonesh (left) and Steve Wakeman use a portable steam drill to re-drill the holes for the GPS antenna support poles. The ridge leading to Mount Blackburn serrates the distant skyline, forming the headwaters of Kennicott Glacier.

Did you encounter any technical or human difficulties?
The Kennicott Glacier lies within Wrangell St. Elias National Park and Preserve, which are mostly designated wilderness. This, and our slim budget, limited motorized access to our GPS sites. A few strategic fixed-wing flights into backcountry landing strips reduced the distances over which we had to ski or hike, but the majority of our equipment travelled on our backs — 3-m-long steel electrical conduits, bulky solar panels, a propane-powered steam drill, and the GPS receivers with batteries in their huge bright yellow cases. During the summer, field days ending around midnight were considered normal.

Any low points, close misses?
There were, I suppose, a few low points — our field assistant developed the mother of all blisters on his heel during the first big excursion, it could be difficult to stay focused during the longest of our through-the-night hikes, and the battery failure in our GPS base station in mid-summer (thankfully after the outburst flood) reduced our good data streams to sunny days when the solar panel functioned well. However, each of these trials was overshadowed by more powerful moments of joy and excitement. Skiing our first GPS unit onto the glacier in early May under crystal-clear blue skies, the privileged feelings of solitude and majesty in a grand landscape and, back in the office, the realization that the outlet river-water chemistry record told such a clear story were just a few of the experiences that enriched our time.

Did you have any encounters with dangerous animals?
Fortunately, no close encounters, but we did at one point get to watch a black bear cross the 4-km-wide glacier about 300 m ahead of us. After it crossed the ice, the bear easily scratched its way up the steep lateral moraine, which we knew from experience was as straightforward to climb as a cliff of sandy weak concrete. It was a fairly impressive display, to say the least.

This is the Backstory to the work by Tim Bartholomaus and colleagues, published on page 33 of this issue.