Winter sampling of a Svalbard glacier forefield

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The Arctic has experienced rapid climate warming and subsequent retreat of ice cover in recent decades, exposing vast areas of pristine landscape that has previously been locked underneath ice for thousands of years. Once exposed, these environments are colonised by microbes which drive further biogeochemical cycles. In 2013 we set out to characterise the initial stages of soil development and the establishment of microbial communities in this harsh Arctic ecosystem following glacier retreat.

Our field site is the forefield of Midtre Lovénbreen in Svalbard. In summer 2013 we travelled to Spitsbergen and spent 6 weeks collecting samples and performing experiments to measure microbial activity in soils. However, I came to realise a significant limitation in our current understanding of forefield dynamics – we know very little about the winter period (soil is snow-covered for the majority of the year), and we don't know if it is important in shaping long term soil development. I was delighted to hear that the Gino Watkins Foundation were supportive of my plans to return to the same fieldsite in the spring to determine whether microbial communities may be actively cycling organic material underneath an insulating layer of snow, and thus contributing to long term soil development in the Arctic.

In early May 2015, I travelled back to Spitsbergen with a team of scientists from Innsbruck's Institute of Ecology. We spent two weeks drilling ice cores, digging snow pits and collecting samples to analyse the properties of the snowpack, soils and frozen lakes in the forefield of Midtre Lovénbreen. Immediately upon arriving in Spitsbergen, it was clear that although the sun had returned several weeks before us, there was no sign of any melting. An endless blanket of snow and ice covered the entire island archipelago. Svalbard is stunning in the summer months, with incredibly diverse wildlife, the vivid colours of the fjords, the ice and the mountains, however with the spring snow cover, it has a fairy-tale-like feel, yet at the same time thrilling and exciting.

During the first few days of orientation, polar bear protection courses, snow-scooter practice, planning and equipment preparation, a few more inches of fresh snow fell. By the time of our first serious day in the field the sky had cleared to reveal bright blue skies and sunshine, as temperatures remained at a crisp -15°C. We set out on skidoo and arrived at our sampling site in 15 minutes (instead of the hour and a half walk in the summer). Returning to base, we were thankful for the trailers to carry our samples; instead of being limited by the amount of space in backpacks and weight on backs.

Throughout the fortnight, the snowpack morphology changed dramatically as temperatures rose to -8°C and even fluctuated up to 0°C at times. This was ideal for the Austrian team, who were hoping to characterise the changes in microbiology and snowpack chemistry as it starts to melt. The glacier forefield began to become recognisable from the months spent there in the summer two years previously.

After just two weeks it was time to return with all of our valuable collection of soil, ice and snow, but not before a swim in the fjord to touch a floating iceberg, a parade for Norwegian Independence Day and a buffet of reindeer steak and ice cream.