

Diary 7 - 20 April 2012

Zackenbergl

Bright sunshine and -20 to -25 degrees Celsius – this is what we've been so very fortunate to experience every day since our arrival at Zackenberg although we had some fog today, which meant no sun to warm you when outside. Currently, the sun rises around 4 AM and sets sometime between 10 and 11 PM - giving us plenty of daylight to work long days in the field. Still, the days seem to go by in an instant! The first couple of days went with most researchers unpacking, assembling and setting up equipment; a never ending process. In addition, there's been the obligatory "Polar Bear Safety" movie screening in the mess hall – accompanied with rifle training.



Figure 1 Inside the Mess Hall. Tonight's showing: "How to survive in bear country". Photo: Casper Tai Christiansen.

Here at Zackenberg in the national park in Northeast Greenland you are required to carry a rifle at any time you leave the station. Obviously, you hope you never have to use it – but should an emergency arise in bear country you are of course much safer when carrying a rifle (if you know how to use it!). For now we are 14 researchers in total – coming from Denmark, Sweden, Austria and Italy and with such diverse backgrounds as engineering, physical geography, glaciology and biology.

The glacier teams are going back and forth to the A.P. Olsen Glacier and setting up their equipment. GeoBasis (Mikkel and Stine) are doing measurements all over – today Mikkel measured methane and carbon dioxide concentrations above and below the snow. I measure the same – but in long term experimental plots where I remove snow before measurements. This means I've dug a lot of holes in the snow out on the heath. Holes up to 1.5 meters deep – there is A LOT of snow here this winter! I fill up the holes after measurements to avoid frost damage to the vegetation. Kirsten and Martin are working on the lakes – Martin is extracting methane from bubbles frozen in the ice and in the sediment. Mads and Niels have been out scouting for musk oxen – when Niels is not busy picking up droppings from the various animals

living here. He's got quite the collection already! So far we've had sightings of snow hare, fox and snow owl. Wolf prints was spotted yesterday by Niels, but no sighting.

Christian is moving his mobile eddy tower around the valley to measure snow and energy balance – today the snowmobile he was using refused to start when it was time to go home. A rescue party was sent out and Christian and snowmobile are now safe and sound in camp. And back here – home – in camp, Jørgen is making sure that everything is working and that we have enough water etc.

I belong to the small group of biologists and although I'm Danish I currently live and work in Canada. I'm here to measure trace gas efflux (CO_2 , CH_4 and N_2O) from semi desert, heath and snow bed ecosystems - as well as drill into the frozen soil and permafrost to retrieve soil samples for carbon, nutrient and microbial diversity and isotope analyses back home. Some of my research interests deal with seasonal changes in soil microbial activity and community diversity as well as differences with soil depth – into the permafrost. For a long time census was that during the long and cold arctic winters 'nothing' happened. It was simply too cold for biological activity – whether it be microbial respiration or plant photosynthesis. Within the last decade, we have grown more knowledgeable in this regard – and winter is now viewed as a significant part of the annual carbon balance in the Arctic. Soil microbial activity may be low – but the longevity of winter in northern latitudes makes for a sizeable cumulative contribution on an annual timescale. My work deals with ecosystem gas exchange and potential changes in rate and microbial substrate use in a changing climate.



Figure 2 Semi desert field site. The actual plots are located under the snow and marked with different coloured flags. Photo: Casper Tai Christiansen.

For the past week I've been working in the semi desert site – attempting to locate the various experimental plots underneath 40 cm of snow. It's not easy when everything looks white on the surface! I have now marked the different plots with colour coded flags – which seems to blend nicely with the background landscape. Today, we were two guys setting out to locate the

heath site which has been buried underneath at least 1.5 meters of snow. Quite the challenge – but with the use of differential GPS and many hours of digging down through the snow we succeeded. Tomorrow it is time to locate the plots in the snow bed community – also hiding below 1.5 meters of snow.



Picture 3 Semi desert field site. The actual plots are located under the snow and marked with different coloured flags. Photo Casper Tai Christensen.

I haven't shaved in weeks and I haven't showered in 5 days – but that really doesn't matter here. The temperature is so cold that the only food you can bring with you in the field is chocolate and nuts – unless you don't mind eating your lunch completely frozen. But as long as the sun is shining you can't ask for better conditions when doing arctic field work. This is just perfect!

We've been blessed with calm and bright sunny weather so far. We can't ask for more. Zackenberg over and out.

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