

Diary 21 – 11 September 2012

To get to know more about the permafrost!

Wonderful Zackenberg! Super nice to have had so far 11 days of intensive fieldwork with sun from a blue sky and only frost during the nights. This enabled excellent fieldwork to be done. The researchers staying here for the last 2 weeks have focussed primarily on obtaining more information about what is below ground in the permafrost in various ways, and how changes in permafrost may interfere with the entire ecosystem. This is because we are part of the new basic research centre *Centre for Permafrost* (CENPERM) at the University of Copenhagen. CENPERM have had up to 14 researchers and students working here this summer, totalling more than 250 working days here. This research is also part of the EU research project PAGE21 *Changing Permafrost in the Arctic and its Global Effects in the 21st Century*, and The Nordic Centre of Excellence, DEFROST, *Impacts of a changing cryosphere - depicting ecosystem-climate feedbacks from permafrost, snow and ice* activities. This combination of projects allows us to work interdisciplinary on permafrost studies from recording the permafrost temperature, its ice content and type, its age, its DNA, microbial activity and various gas production and net emissions in various landforms.

One of our main aims of this year's visit was to establish boreholes into the permafrost. For this reason our smaller scale Svalbard based drill rig, Betty, travelled by boat via Norway, Denmark, Iceland, W Greenland and finally to NE Greenland, where it has now very successfully drilled two deeper holes, to 21 and 19 m. The very first temperature recordings towards the bottom of these holes are about -6°C. So we are dealing with colder permafrost than what we have at sea level in Svalbard, where it is typically -3 °C. Permafrost sediment cores have been collected from these two holes, and we are right now preparing the samples for their frozen journey to the laboratories, in which they will be analyzed in the years to come. And form part of several master and Ph.D. theses.

Research efforts such as this one on permafrost demands cooperation. Therefore it is a special pleasure to be able to cooperate thanks to INTERACT EU funding given to the UNIS research team, allowing us to bring our permafrost drilling and temperature recording experiences from Svalbard to Zackenberg. Let us hope that the future will bring much more cooperation across this largest climatic gradient on the Northern Hemisphere, between warm Svalbard and cold NE Greenland. These two neighbouring regions are geographically and in many other ways so close, but still so far apart logistically.

Some of us have been here before. Twenty years ago, we camped in tents not too far away from the present runway, while starting up some of the basic research of this area. In 1995, shelters were used at the present location of the Zackenberg Research Station for the start of some of the first monitoring such as locating the meteorological station. Those were the days, when I was one of the first GeoBasis Managers. Since then an almost incredible development has happened at this site, developing the internationally very well recognized and unique Geo-, Bio-, Climate-, Glacio- and Marine-Basis monitoring programmes. Just as the station infrastructure is now containing 11 houses and shelters, and now accommodates the researchers indoors. Data from the monitoring programmes are starting to form a rather comprehensive series, very useful for the basic research carried out here as well.

Having followed the impressive development of the special combination of monitoring and research at Zackenberg is very nice. This place certainly have large potential for keeping its present location high on the list of key Arctic Research Stations, which effectively provide excellent possibilities for both coming, new and well-established researchers widely ranging primarily within bio- and geosciences.

It has also been a pleasure to see how Zackenberg can be used for outreach to a small, but rather dedicated audience from the Norwegian hurtigruta ship FRAM. Up to 220 cruise passengers today had the opportunity to spend up to 2 hours here, getting to know about the logistics, monitoring and research done at this unique place. Most likely, this was the day with most persons ever at the Zackenberg Research Station.

We are soon leaving, and back home to the north and south of here, but leaving a smaller team to stay and keep the basic monitoring going into November.

Hanne H. Christiansen, UNIS

Bo Elberling, CENPERM, University of Copenhagen & UNIS