

Summary of the first secondment at the University of Copenhagen

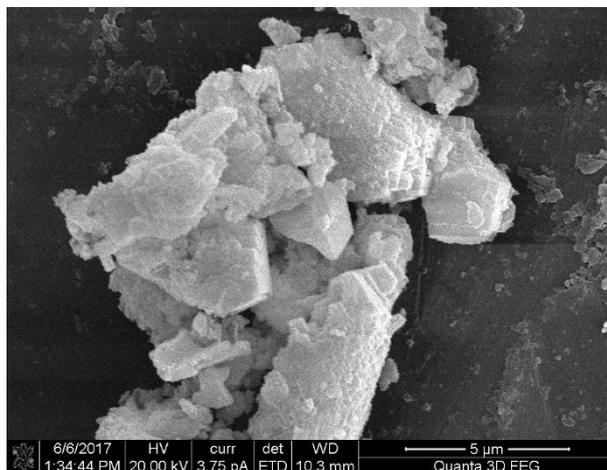
Subsequent to our second network meeting in Denmark I, Tobias Linke (ESR at the University of Iceland), have spent one month at the University of Copenhagen. This was not only part of my first secondment but also the first secondment of the whole project.

For this secondment, I brought several sediment cores and other solid samples from Iceland with me. The task was to analyse these solid materials regarding their mineral content, so we get a first overview of the mineralogical composition of the samples. Since we are especially interested in green rust, which oxidises under normal atmosphere, this was also a first attempt to preserve solid samples under oxygen free conditions. Therefore, the samples were stored under a Nitrogen atmosphere and vacuum-sealed. In the laboratory in Copenhagen, I worked in an Oxygen-free glove box to keep the samples under reduced conditions.



This photo shows one of the sediment cores, which were taken in Iceland and then analysed during the secondment at the University of Copenhagen. The whole work was done under Oxygen-free atmosphere in a glove box.

In Copenhagen, I had the opportunity to analyse the samples with powder X-ray diffraction XRD, which can be used to identify the different crystalline minerals, and with scanning electron microscopy SEM, to look at the samples at very high magnifications (up to 100.000).



On the left you can see a SEM picture from some particles under high magnification (scale bar 5 μm). It shows some well crystalline minerals with nice angular shapes.

Unfortunately, this is not typically for all samples, which makes the analysis of the minerals more complicated.

It has been recognized that the measured samples mainly consist of poorly crystalline materials and show a relatively simple chemical composition. Iron containing minerals are the most abundant crystalline phases in the samples from the Icelandic peat areas.

Beside the common mineral identification with XRD, it was possible to prepare some samples for a relatively new technique called pair distribution function PDF. This technique is only available in a few places around the world since it uses high energetic synchrotron radiation. But, through this technique it becomes possible to get more information from less crystalline samples, which is very promising for my future work.

Even if we have not found any green rust in these samples yet, this first secondment was very helpful for a better understanding of the natural system I am working on. Certainly, I will come back to Copenhagen in the near future to do more analysis together with the great help of the people working there.

Tobias Linke