



Welcome! It is fantastic to see you all, I'm so happy so many talented researchers from different parts of the world want to join our new network.

So, welcome to this CatchNet meeting, the first one in a four year project.

I'm Emma Johansson, I'm coordinating CatchNet and representing the Swedish Nuclear Fuel and waste management company.

I'm working at the research department at SKB since 15 years. I've been working with site modelling and safety analysis and the last years I'm responsible for the hydrology-climate research programme.

The first thoughts about starting up CatchNet started some 2 years ago. SKB had more or less finished the research projects we had in Greenland. It all started with me and Ylva discussing possible ways to collaborate and we thought it would be nice to start up some kind of club gathering people interested in cold region hydrology. In the same time Jeff contacted me and asked if SKB wanted to share some work and ideas related to our Greenland site. So, we have a meeting in Stockholm about a year ago where we discussed possible ways for collaboration. After that we made a list of people and organisations we wanted to have on board in order to be able to do something relevant within this field. And everyone on that list is here today, which is fantastic!

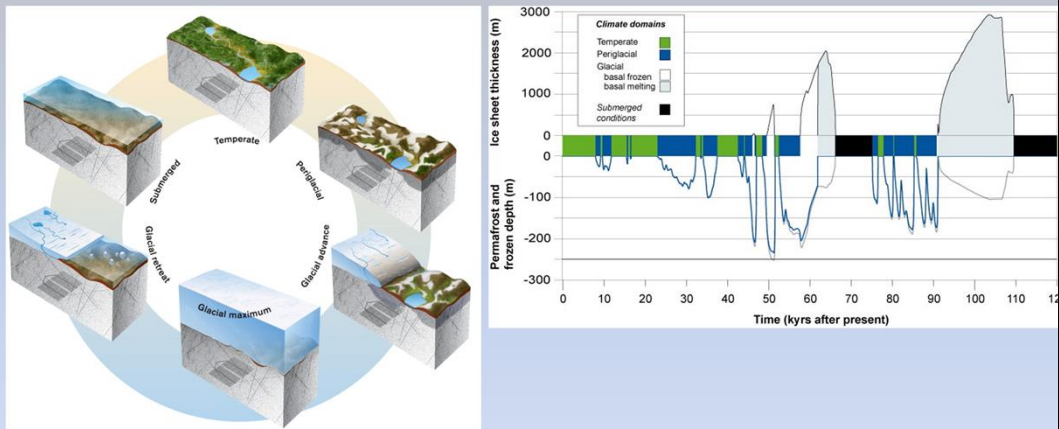
Outline

- Who are we, short presentation around the table
- Aim and background
- Members and organisation
- Overall timeplan for CatchNet
- Presentation of research packages
- Today's agenda



I will start this meeting by saying a few words about CatchNet, the aim and background of this project and how we gonna be organised. But first, we take a very quick presentation around the table. Not your whole story, but why you are here where you work.

Aim and background



- Geological repositories for spent nuclear fuel, long time frames
- Long term safety assessment (100 000 y)
- Climate change and landscape development
- Analogue sites to learn about features and processes during different climate states

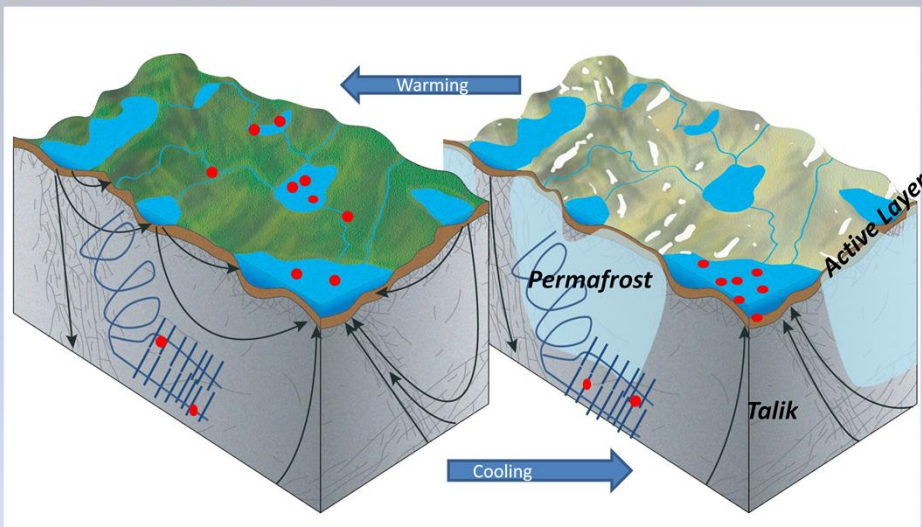


So why is cold region hydrology interesting and relevant for nuclear waste organisations? Well nuclear waste and spent nuclear fuel have to be kept isolated for humans and the environment during very long time frames and this will be done by different kinds of geological repositories.

Within the safety assessments we have to consider different climate scenarios and how for example a glaciation or a time period of permafrost will influence the long term safety of the repositories.

Therefore we work with analogue sites to learn about features and processes during different climate states

Aim and background



Nuclear waste industry and the scientific community have many needs and questions in common

- Climate change assessment
- Transport and cycling of carbon in a changing climate
- How deep down in the bedrock can meltwater penetrate and what is the chemical composition of this water?
- Infrastructural stability
- Recharge – discharge of deep groundwater
- Need for a multidisciplinary approach
- Data scarcity from arctic environments



The research driven by the nuclear waste industry is not that different from the climate research going on in the more broad scientific community. We have many needs and questions in common.

We all want to understand how hydrological processes are affected by a changing climate.

How do we understand the hydrological storage and partitioning of water in a periglacial landscape with permafrost, taliks and an active layer compared to a temperate landscape where topography and bedrock fracture zones are governing the groundwater flow. For the nuclear waste safety assessment the question about recharge and discharge is of course central since we want to understand the flow paths of water from repository depth up to the surface system.

But we can make a long list of questions where a better understanding of hydrology in periglacial environments are motivated:

Aim and background

- **GRASP:** To increase our understanding on effects of future periglacial landscapes and ecosystems with focus on hydrological processes and biogeochemical cycling (SKB)
- **GAP:** To increase our understanding of future glaciations. How is groundwater flow and groundwater chemistry at c 500 m depth in a crystalline setting affected by the presence of an ice sheet? (SKB, NWMO, POSIVA)
- The two projects have resulted in several scientific reports and publications and the overall level of understanding of cold region processes related to long term safety has increased substantially.
- **CatchNet:** Fill remaining knowledge gaps by international collaboration between nuclear waste industry and the academic world (COVRA, NWMO, Posiva, SKB, GRS, RWM)



We are not total beginners in this area. Two quite large projects are finished, the GAP and GRASP.

Overall all scope of CatchNet

- Site specific modelling
- The focus of this activity is **hydrology in the periglacial landscape** even though the coupling to other hydrological features, such as the ice and the sub-glacial water system are important in order to conceptualize the periglacial hydrological system. There is also a close coupling to biogeochemistry and transport of elements in the periglacial system where hydrology is one of the main drivers.
- Use already existing data from sites with different permafrost characteristics. Sites along a climate gradient from cold temperate to cold periglacial climate:
Forsmark – Krycklan- Umiujaq- Wolf Creek – Yukon Flats- Greenland



CatchNet is focused on site specific modelling. And the focus of the network is.....

Members and organisation

- **Nuclear waste organisations**
 - **Full member:** Member fee and full funding of PhD student
 - **Supporting member:** Member fee
- **Universities, non profit organisations**
- **Site representatives**

PhD group, post docs:

- Students doing the actual modelling work
- A very important driver in the network
- Constitutes a group with a common objective
- 4 PhD students, 2 post doc

Core group:

- Representatives from full member funding organisations (SKB, NWMO, Posiva)
- Supervisors for PhD students (Jeff/Barret, Ylva, Sean/Johan)

Experts:

- Representatives from nuclear waste organisations
- Researchers/experts from universities, non-profit organisations or research sites
- Internal review, discussions, "general fuel for the group"



So, who are we in this room?

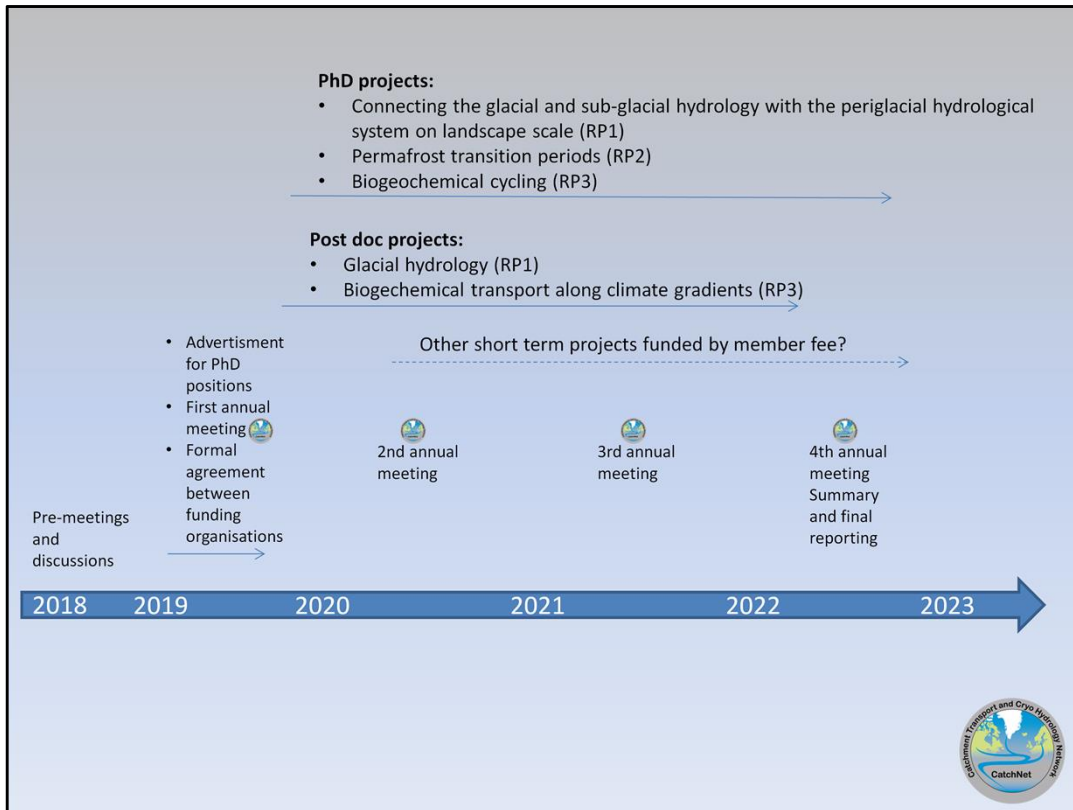
There are the funding organisations and we can either be full members or supporting members.

We have people from different universities and non profit organisations and we have people in this room representing different sites.

Core group: The full members, which is funding a PhD student together with supervisors for the student constitutes the core group. The core group decides on what the member fee can be used for and which research questions to focus even though this of course also is discussed in the whole group.

The engine of the group are our PhD students and post docs. You are the one doing the actual work and modelling. Today we have funding for 4 PhD and 2 post docs. Then we have the experts, some of you are representing the nuclear waste organisations and some are from the academic world. Among you we find people that have a lot of interesting data to work on, some of you will have the role of internal reviewers of the research going on in the group.

Some of you are PhD students working within this area and hopefully we can benefit from each other's work. Some of you are working with permafrost hydrology in your daily work, your research is already funded but then CatchNet is a group where findings and problems can be discussed.



Here is a broad time plan of the CatchNet work. This is a 4 year project.

Today's agenda

- **Before lunch: Presentations of research packages and related group discussions**
 - One group for each RP
 - One group focusing on overall organisation and roles
 - After group discussions and summary thereof you should know:
 - My role in CatchNet
 - Where can I contribute the most and how will CatchNet be beneficial to me/the group I am representing?
 - Have we captured the main needs from all organisation in the three RP's? (given that this is all about Site-specific modelling of cold region hydrology)
 - Which sites to focus on
- **After lunch: Discussion of paper production**
- **Group photo**

