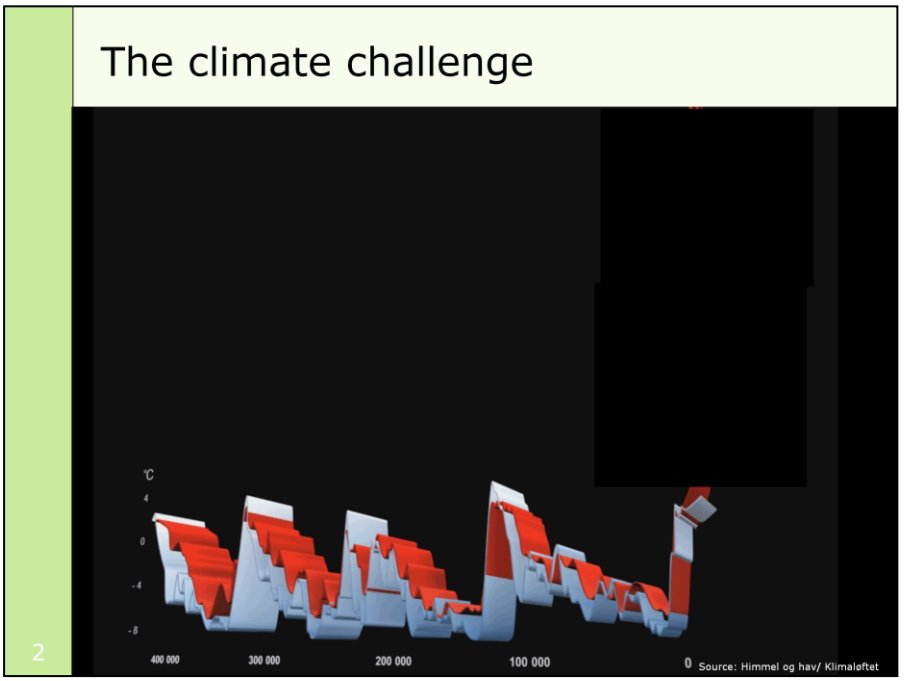
Picture: The glacier "Bøverbreen" in the mountain area Jotunheimen in the southern part of Norway.

I am honored to be given the opportunity to open this international conference "The Frozen Pasts".

As a politician I have never experienced to open a conference at 8 o'clock in the morning. I will remember that archeologists are hard-working people.

The conference brings together experts from different areas on the subject Glacial Archaeology. This is a subject that has become most present in the news during the last couple of years, with the focus on climate change and the massive melting of glaciers. However, many of us became aware of this phenomena already in 1991, with the find of the Ötzi-man in the Alps. This find is mostly an outstanding archeological find, but it is also a symbol of the increasing global challenges related to climate change.



This figure shows the relationship between temperature and greenhouse gases, based on analyses of ice chores from Antarctica. The blue belt shows the temperature, and the red belt shows the concentration of CO2 up until the industrial revolution.

Klikk 1: This shows the increase of greenhouse gases up until today. Klikk 2: This shows what most likely will happen the next 40 years, if we do not reduce CO2-emissions.

The planet is now experiencing levels of CO2 in the atmosphere that is nothing like what we have seen the last 400 000 years.

Climate change can now be observed out in the nature. The extent of the polar sea ice has dropped much faster than predicted by even the most pessimistic models. The scientists still don't fully understand the collapse of the polar sea ice we have seen since 2006.

On these pictures we can see the Briksdal glacier, in the south-west part of Norway. It is an outlet of the glacier Jostedalsbreen, which is the biggest glacier on the European mainland.

Norway has long experience from studies of glaciers on the Norwegian mainland. Mass balance, change in glacier length and glacier velocity, have been measured for nearly 60 years.

Data on changes in glacier length on glaciers in Norway, show that glacier outlets, in general, have had a retreat in length in recent years. On this pictures from the Briksdal glacier, the green signs indicate the position of the glacier front in 1870 and 1920.

Due to the enormous digging power of a glacier in motion, a sensational discovery was made in 1995, in front of the Briksdal glacier. A piece of a willow trunk [seljestokk] was found, which was determined to be 8400 years old. The log dated from a period when the glacier was smaller than today.

And in the period 7300 to 6100 years ago, all of Jostedalsbreen melted away. It is likely that at that time, the area around Briksdalsbreen was covered by a forest.

[Source: Jostedalsbreen nasjonalpark visitor centre, The County Governor in Sogn og Fjordane, and ranger service, Statens naturoppsyn.]

The glacier Svartisen, in the northern part of Norway, is a glacier being explored by scientists from all over the world.

Svartisen Subglacial Laboratory is situated under 200 meters of ice. The laboratory provides a unique opportunity for direct access to the bed of a temperate glacier.

In tunnels into the glacier, scientists led by the Norwegian Water Resources and Energy Directorate (NVE), do measures.

These measures can give us important information relevant for agriculture, water supply, energy production and precautions concerning floods and landslides.

Maybe this subglacial observatory will discover some old cultural heritage items as well?

This snow patch is called Juvfonna, and it is situated in Jotunheimen, close to Norway's highest mountain Galdhøpiggen (2469 meters above sea level).

The snow patch Juvfonna has withdrawn as much as 18 meters only this year! It can easily be seen by the light gray area around the snow patch without moss.

[Click; animated picture of reindeers]

Reindeers have for hundreds of years wandered in the mountain regions. In the summer they went to snow patches to cool off and to get away from insects, just as the smaller picture shows (the picture is taken close to Galdhøpiggen in Jotunheimen). Hunters followed the animals and put up a system with sticks that functioned as some sort of a reindeer fence. The sticks frightened the reindeer towards other hunters that hid behind shelters built of stone, bow positions.

Because of todays warmer climate, archaeological organic finds are melting out of the ice. These old items provide both climate researchers and archeological researchers with important data. Usually all organic material have been decayed, but the ice has preserved such material very well.

The picture to the left shows a famous shoe, which is 3400 years old! This was found near Kvitingsskjølen in Jotunheimen, and has been preserved in a glacier until recently. This is, as far as I know, the oldest shoe in Norway.

Both the Minister of the Environment and Development, Mr Erik Solheim, and I had the opportunity to visit Jotunheimen this summer. We learned about the important work that is being done to preserve old items coming out of the melting ice. We understand that time is short and that its is crucial to act quickly when new finds are revealed.

On the picture you can see me holding a wooden stick, which has appeared from the melting snow patch Juvfonna in Jotunheimen. This stick, also called a sewel or scaring stick, is part of the hunting system I talked about earlier. Together with me is my daughter and project leader Espen Finstad, who will speak more about Ice Patch Archeology later today.

Here you can see two recent articles, one from the Norwegian newspaper Aftenposten, and the other from Reuter. Both of them tell us about the rapid melting of snow this year, and how this makes it difficult for archaeologists to preserve all the snow patches finds.

Finds like this will increase in the future. They will give us valuable knowledge about human activity in the past. They also give us an opportunity to bring together scientists of different areas and visualize the effects of climate change for people in general.

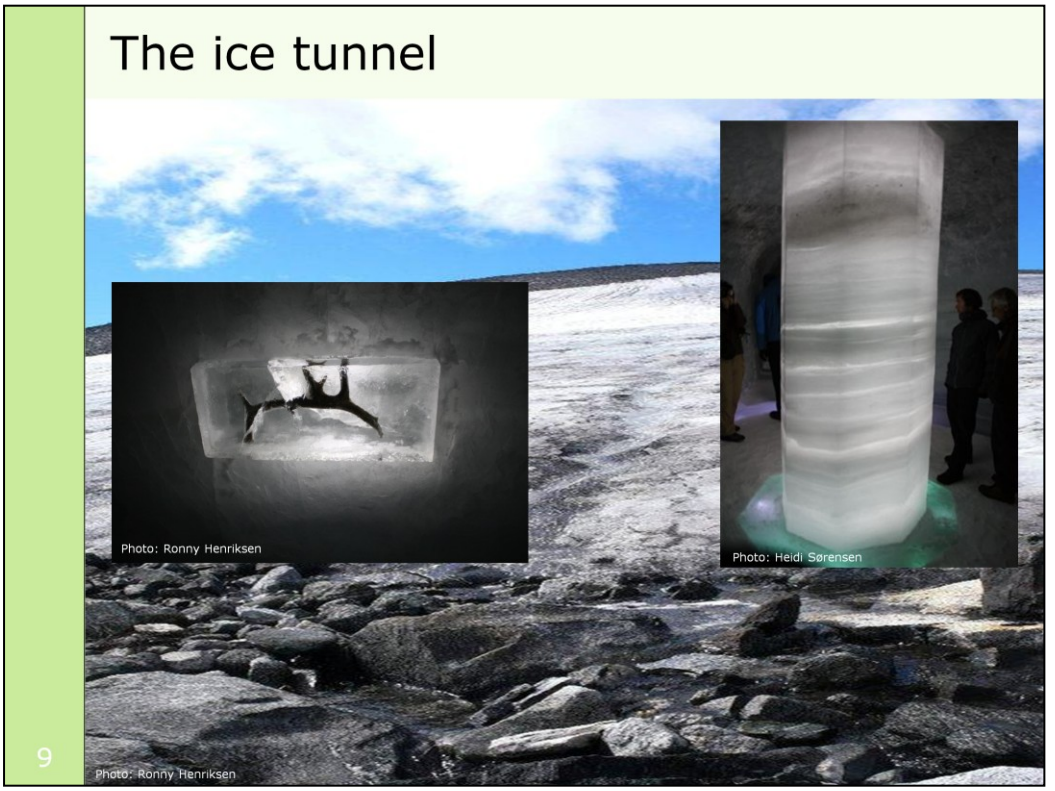
This is an obligation this government has taken, stated in the "governing platform" (Soria Moria II), that states clearly that we will "Increase the knowledge on archaeological finds melting out of ice and snow patches in the high mountains due to climate changes".

The project in Jotunheimen is called "Climate Park 2469" (Klimapark 2469), where the number refers to the altitude of the mountain Galdhøpiggen, which is the highest mountain in Norway. Climate Park 2469 is located in the alpine region around Galdhøpiggen (2469 metres) and the Juvasshytta lodge.

The goal of the Climate Park 2469 is to communicate new climate-historical knowledge to young and old. The climate park will be a site where visitors can physically sense and experience climate change and the relationship between nature and culture from a long-term perspective.

I am very impressed by the work of Oppland county, which is responsible for the "Climate Park 2469". People from the Norwegian Nature Inspectorate (Statens Naturoppsyn) are guides in the project, and give people an opportunity to see the impacts of climate change.

One of the Climate Park 2469 main attractions this year was the opening of an ice tunnel. A 30 meters long tunnel was carved into the Juvfonna snow patch. This tunnel brought visitors to a travel into the ice and journey in time.



Here you can see some pictures from the spectacular ice tunnel at Juvfonna, a tunnel which have been heard of in many countries.

Someone told me that a lady from the Unites States came all the way from New York to Juvfonna to experience how it is to walk inside an ice glacier.

In the ice tunnel, you can get information about climate changes and the archeological finds, like the horn of reindeer, seen in the ice block.

Norway possesses extensive knowledge about climate and glaciers from studies of glaciers in Svalbard, where this picture is from, and in Antarctica, where we have a research station called Troll.

The Arctic is a highly priority area for Norway in our work with climate change. We have a special focus on monitoring and the consequences related to ice and glaciers.

When the minister of finance presents the next year state budget today, he will reveal increased funding for research on ice and climate.

Cultural heritage in Svalbard has a special position, both in the legislation and management, where cultural heritage and nature management is combined. But also because of the harsh climatic conditions in Svalbard. Protecting and managing the cultural heritage has different approaches.

First [click]: certain items are supposed to remain in peace. All cultural heritage, monuments and sites from before 1946 are automatically protected. And example of this is this German airplane from the Second World War (you can see the wreck of this plane on the picture to the right, on top).

Secondly [click]: some items have to be repaired. Because of the thawing permafrost and erosion settling, damages occur on for examples buildings. Action has to be taken to stabilize the construction. Because of the melting permafrost, wooden constructions will also sink down in the melting ground and more easily be exposed to rot/decay. One example of this is the Swedish house (Svenskhuset) Kapp Thordsen (picture down right).

And last [click]: other items have to be replaced. One example of replacement is part of a larger system of boughs (picture to the left), that illustrate the former distribution of coal to the harbour of Longyearbyen, the main town in Svalbard.

The small picture show an old hunting station in Svalbard (in Recherchefjorden). The building is falling apart because of thawing permafrost.

In arctic areas, thawing permafrost will make the condition a lot more difficult for the preserving of archaeological material. The foundations for buildings will become unstable. Reduced sea ice by the coasts of areas like Svalbard and Greenland, will lead to increasing erosion made by waves. Cultural heritage by the coasts will suffer.

Warmer summer temperatures will lead to poorer conditions for organic material. Increased temperature will lead to more rot. A shorter season of sea ice, will damage the cultural heritage exposed to waves and erosion.

In August this year, there were fourteen Norwegian reptile hunters doing field work at the foot of the Janus Mountain in Svalbard, digging for remains of prehistoric sea monsters from the Jurassic period.

The first pliosaur fossils were found in Svalbard more than a hundred years ago. But a lot of work remains, before the reptiles are uncovered and brought to museums for preparation and further research.

In 2004 - 2009 several expeditions uncovered fossils, and skeletons were brought to Natural History Museum at the University of Oslo. This year more will be brought out of the ground, hopefully in good shape. Maybe they also will find new species.

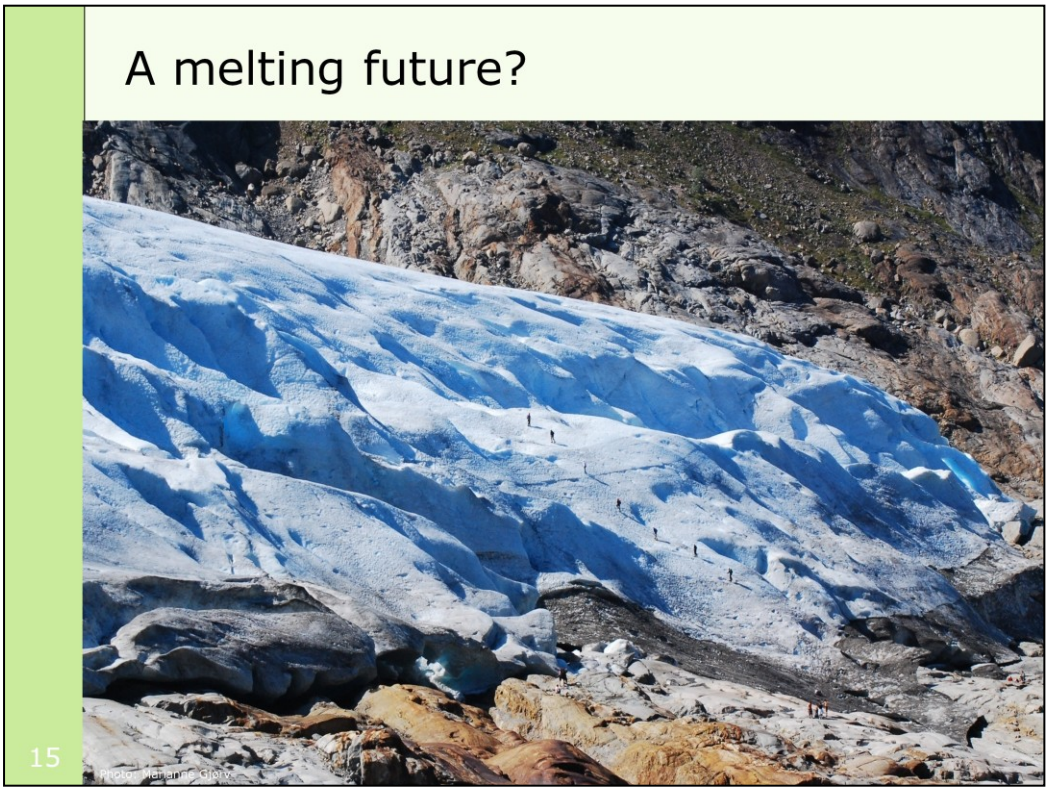
(Source: http://www.forskning.no/svalbard/index_english.html)

As you can see, the impacts of climate change might do severe damage to both nature and cultural heritage. There is a lot to loose if we do not act in time.

Here you can see the world heritage site Bryggen, which is the old wharf of the city of Bergen, on the west coast of Norway.

Bryggen is very vulnerable to rising of the sea level.

Cultural heritage is not the cause of climate changes, but it is a sector that will have to cope with the problems. The predicted weather changes will influence biological, chemical and physical decomposition, and it will probably lead to increasing decay of cultural property and cultural heritage. This will have to be reflected in the cultural heritage management.



The picture shows Engabreen at the glacier Svartisen, in the county of Nordland.

For the future, I hope that humans still will have the opportunity of experiencing glaciers, snow and ice patches. I also hope that we can look back and conclude that we took the challenge we were given of saving the remains of the frozen pasts. Thank you.