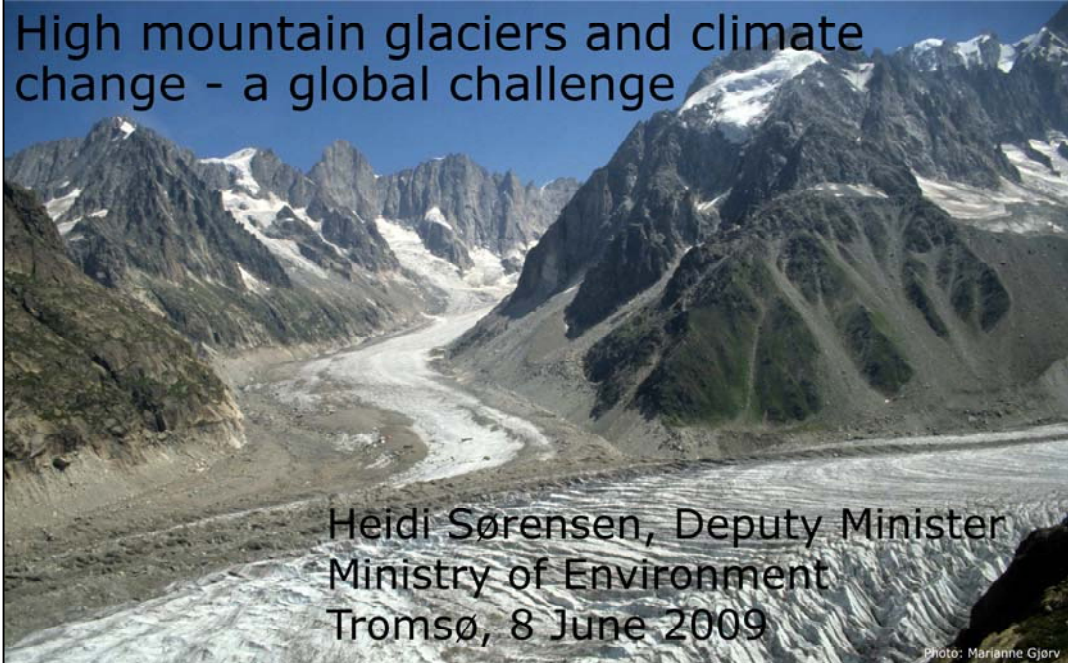




MILJØVERNDEPARTEMENTET

## High mountain glaciers and climate change - a global challenge



Heidi Sørensen, Deputy Minister  
Ministry of Environment  
Tromsø, 8 June 2009

Photo: Marianne Gjorv

Ms Chairman and distinguished guests,

On behalf of the Ministry of the Environment, I am honoured to be given the opportunity to open this conference that brings together scientists and policy-makers from different countries on climate change and high mountain glaciers.

Finding arenas for policymakers to interact with scientists and learn about consequences of climate change, is crucial in order to motivate for the brave actions needed if we are going to avoid dangerous climate change.

## The Greenland Ice Sheet is melting



In 2004 I had the opportunity to go by air across the Greenland Ice Sheet.

It made a great impression on me. I saw the melting ponds in the middle of the Greenland Ice Cap.

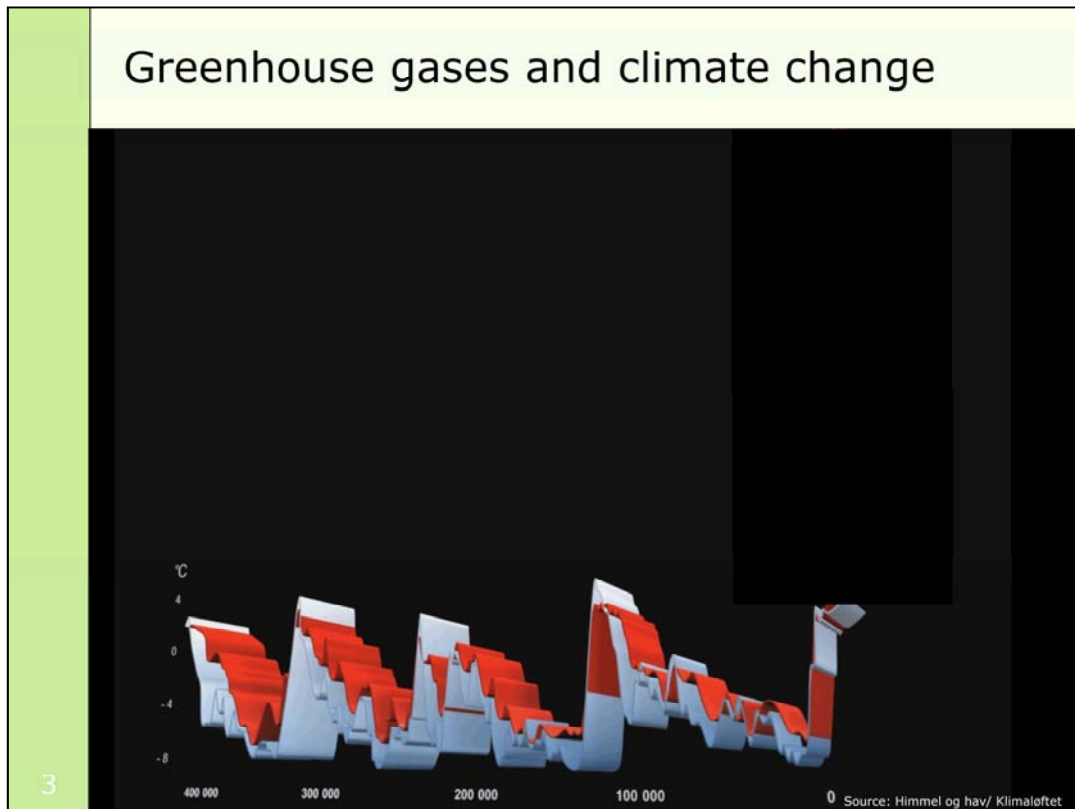
Knowing that the ice sheet at some places is more than 3000 meters thick, made me realize the power of climate change.

The reason why I went to Nuuk, was a presentation of the Arctic Climate Impact Assessment report.

The visit was very useful and I learnt a lot about melting of the Greenland Ice Sheet and its consequences.

With a melt down of the Greenlandic Ice Sheet, the sea level is expected to rise 6-7 meters.

## Greenhouse gases and climate change



*This figure shows the relationship between temperature and greenhouse gases, based on analyses of ice cores from Antarctica. The blue belt shows the temperature, and the red belt shows the concentration of CO<sub>2</sub> up until the industrial revolution.*

Klikk 1: This shows the increase of greenhouse gases up until today. Klikk 2: This shows what will happen the next 40 years.

The planet is now experiencing levels of CO<sub>2</sub> 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.

Rapid loss of sea ice is likely to speed up the warming of the Arctic as well as the globe.

It could also trigger other processes, such as release of methane from melting permafrost and more rapid sea level rise from melting of the Greenland Ice Sheet.



To avoid dangerous climate change, including vicious cycles related to the Arctic climate system, it is imperative to limit global warming to 2 degrees Celsius above pre industrial levels.

I am old enough to have taken part in the discussions about whether the "2 degrees Celsius target" is insufficient. We are not certain that this target is sufficient to avoid the Greenland Ice Sheet from melting.

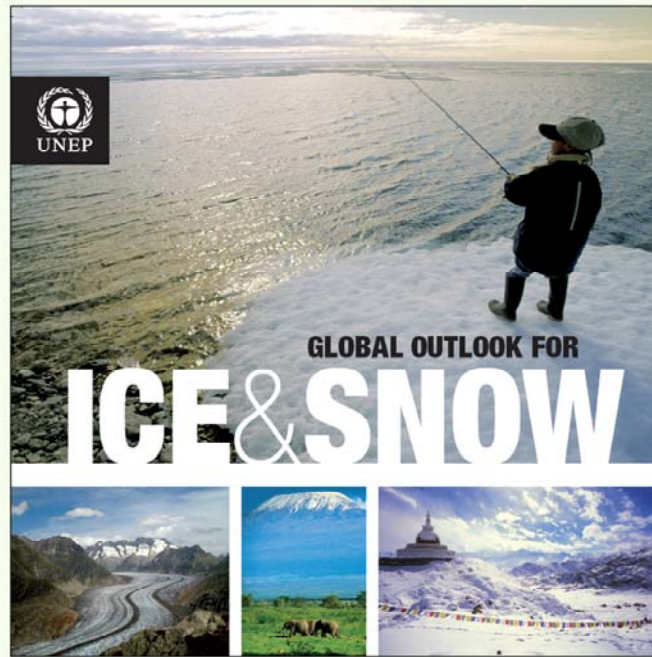
The "2 degrees Celsius target" will require at least:

- A peak in global greenhouse gases emissions by 2015
- Reductions in global emissions by 50-85% by 2050.

Achieving the "2 degrees Celsius target" is very ambitious, and some will say unrealistically ambitious.

Together with the EU, Norway links the "2 degrees Celsius target" to the negotiations for the climate conference in Copenhagen later this year.

UNEP's  
global  
outlook for  
ice and  
snow



5

In 2007, Norway was honored to host the international World Environment Day.

The celebrations took place here in Tromsø, and the main topic was melting ice.

One of UNEP's contributions to the World Environment Day was the book: "Global Outlook for Ice and Snow", where the vanishing of mountain glaciers is highlighted.

## Melting ice will cause severe consequences for ecosystems and humans



6

Photo: Marianne Gjørv

Scientists predict that ice and snow in the mountains that feed many of the world's main rivers could melt away because of global warming.

This melt down could result in severe consequences for both ecosystems and human needs.

Reduced water flow will lead to shortages of water for transportation, drinking water and irrigation.

It may as well lead to critical conditions for fish and other aquatic forms of life.

In reduced water flow is an increased potential for disputes on regional allocations of a diminishing resource.

## Large populations depend on water from glaciers



7

Photo: Marianne Gjør

Large populations depend on water from glaciers during the dry season.

Such areas are India, China and other parts of Asia, and in the South American Andes.

## The Himalayas



8

Photo: Andyindia

The Tibetan Plateau has more than 45,000 glaciers. They build up during the snowy season and then drain to the major rivers in Asia, including the Yangtze, the Yellow River, Brahmaputra and Mekong.

Temperatures in the plateau, which some scientists call the "Third Pole", are rising twice as fast as other parts of the world.

According to experts, nearly 2 billion people, from coastal city dwellers to yak-herding nomads, will begin suffering from water shortages as global warming shrinks glaciers on the Tibetan Plateau.

The glaciers from mountains in the Kyrgyz Republic and Tajikistan, also feed the rivers Syr Darya and Amu Darya, that drain into Kazakhstan and Uzbekistan in Central Asia.



## The Andes



On this picture we are looking towards the Andes and “Torres Del Paine”, in Chile.

Chile's official water authority has warned that the Echaurren glacier near Santiago, which supplies the capital with 70 percent of its water needs, could disappear in the next half century.

In a new report on Chile's glaciers the main water company said the ice fields of Echaurren are receding up to 12 meters (39.37 feet) per year.

According to Antonio Vergara, from Direccion General de Aguas de Chile, the water shortage would force Chileans to seek new sources of water and would cause "large-scale population displacement in central Chile."

## The Alps



This picture is from the French side of the Alps, but it is not far from the Swiss border.

Switzerland has around 1,800 glaciers. Experts say that if the temperature rises by an average of three degrees Celsius, 80 per cent of them will disappear by 2100.

A rise of five degrees would lead to their total disappearance.

Currently, Swiss glaciers are melting at a rate of three per cent a year.

One of the Swiss glaciers is the Rhône Glacier which is the source of the [Rhône River](#) and one of the primary contributors to [Lake Geneva](#).

## Norwegian glaciers on the mainland



The glacier on the picture is Austerdalsbreen, in the south-west part of Norway. It is an outlet of the glacier Jostedalbreen, 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 published in 2008 on changes in glacier length, shows that glacier outlets, in general, had a retreat in length. The glaciers Fåbergstølsbreen and Brenndalsbreen, both outlets from Jostedalbreen, showed retreats of 50 and 60 meters.

Investigations of mass balance on glaciers in the southern part of Norway, show that the net balance was positive for eight of twelve measured glaciers.

In the north of Norway, the glacier Langfjordjøkelen have had a deficit for the last twelve years.

## Norwegian glaciers on Svalbard



12

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

**The Arctic** is a priority area for Norway in the climate negotiations, with a special focus on monitoring and the consequences related to ice.

Norway will use the Arctic, and Svalbard in particular, as a showcase to build awareness about the impacts of climate change, at a regional as well as a global level.

## Center in Tromsø for research on ice and climate



There is however a great need for more knowledge about the consequences of melting ice.

We are now strengthening and developing this scientific knowhow by establishing a new competence centre for research on ice and climate here in Tromsø, called ICE.

An important task for the new center will be to communicate this knowhow to politicians, managers and the public in general.

The picture shows how the climate expert James Hansson, Minister for Environment and Development Eric Solheim and Director of the Norwegian Polar Institute Jan Gunnar Winther cut a piece of ice at the opening of the center.

## Melting Ice - Regional Dramas – Global Wake-up Call



Nobel Peace Prize Laureate Al Gore and  
Foreign minister Støre in Tromsø, April 2009

14

Melting of high mountain glaciers was one of the central issues on the conference called *Melting Ice: Regional Dramas, Global Wake-Up Call* in April this year.

The conference was arranged here in Tromsø by the Nobel Peace Prize laureate Al Gore and foreign minister Støre. It took place the day before the Arctic Council's biannual ministerial meeting.

The conference clearly unveiled that the present knowledge on melting of high mountain glaciers is as a whole, comparatively smaller than is the case for instance for the Arctic.

## A status report on melting ice



At the Melting Ice Conference in Tromsø, a task force was established.

This task force will write a report on the status of and future scenarios for the melting of ice in affected areas worldwide.

It was stated at the conference in April, that the work should be supported and amplified by this expert conference in Tromsø here today, on High Mountain Glaciers and Challenges Caused by Climate Change.

The report is to be presented to policymakers at a high level event during the UN Climate Change Conference in Copenhagen in December 2009.

## The Climate summit in Copenhagen



President Obama has shown that he is a driver for change, in facing both the financial crisis and the climate crisis.

We hope that the US vil be an important driver for a new global agreement in Copenhagen in December concerning emissions of greenhouse gases after 2012. An agreement between China and the US will be essential in the climate negotiations.

The scientific findings on melting ice and snow globally, underline the urgent need for strengthened action to curb global emissions of greenhouse gases.

There is a need to consider actions that will make an impact on ice melting in the near future and underlines the imperative of *adaptation to the impacts* of unavoidable climate change and consequences of melting ice.



## Melting ice – a global challenge



This picture is from Nepal and shows a mountain called the Fish tale, not far from Mt Everest in the Himalayas.

Around the Himalayas and the Andes, the situation will prove critical. Melting of the glaciers will have severe physical, environmental, social and economic consequences.

The people who live in these regions cannot face these challenges alone. Industrialised nations must assist by becoming part of the solution.

I hope that this conference will contribute to bring forward knowledge that can raise the awareness of the serious challenges countries with high mountain glaciers are facing.

Together with the state-of-the-art report, we should form a clear message to the UN Climate Change Conference in Copenhagen.

We have everything  
we need to get  
started, save  
perhaps except  
political will...

...but political  
will is a  
renewable  
resource.

Al Gore, Nobel  
Peace Prize  
Laureate

18

