

# ARCTIC FUTURES SYMPOSIUM 2011

THE ARCTIC  
IN A TIME  
OF CHANGE

OCTOBER 12<sup>th</sup> - 14<sup>th</sup>

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FINAL REPORT



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## PREFACE

As a non-profit organisation dedicated to bridging the science-society divide, the International Polar Foundation (IPF) has for the second year in a row led the organisation of an interdisciplinary and multinational conference on the future of the Arctic: the Arctic Futures Symposium.

The symposium is an annual forum to have a well-informed discussion on key issues such as transport and infrastructure, search and rescue, the future of Arctic research and monitoring, ecosystem stewardship, management of natural resource development, and indigenous affairs. Every October, EU and foreign policymakers, scientists, indigenous peoples, representatives of industry and academics come to the symposium to discuss needs, address challenges, exchange ideas, and network.

The Arctic Futures Symposium 2011 was organised in conjunction with the Prince Albert II Foundation of Monaco, and had the distinguished honour to welcome H.S.H. Prince Albert II of Monaco as a featured speaker, along with President Ólafur Ragnar Grímsson of Iceland, France's Ambassador to the Polar Regions and former French Prime Minister H.E. Michel Rocard, and a number of other highly distinguished members of the EU Institutions and senior Arctic officials.

What follows are the proceedings of the symposium.

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# WEDNESDAY

## 12 OCTOBER 2011

*The first day of the Arctic Futures Symposium 2011 was a highly anticipated and highly successful day, with HSH Prince Albert II of Monaco and the President of Iceland, Ólafur Ragnar Grímsson, contributing to the programme along with a wide range of senior Arctic Officials from many of the Arctic Council nations as well as high-ranking officials from the European Institutions and other Europe-wide organisations.*

*The final session of the day saw Executive Secretaries and experts from a number of Arctic Council working groups as well as a representative from the shipping industry come together to discuss issues such as pollution, shipping, and monitoring biodiversity.*

## OPENING STATEMENTS

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### ALAIN HUBERT

PRESIDENT OF THE INTERNATIONAL POLAR FOUNDATION (IPF)

In his opening statement, Alain Hubert emphasized that the Arctic is undergoing a time of change, and these changes have been seen in a legal perspective: firstly in January 2011 when the EU agreed on a resolution on a sustainable policy for the High North, and secondly in May 2011 with the signing of the Nuuk Declaration at the Arctic Council Ministerial, the first legally-binding search and rescue agreement from the Arctic Council. He also highlighted the declining sea ice cover in the Arctic as a sign of the changes taking place in the region, and mentioned the IPY conference taking place in Montreal in April 2012, "From Knowledge to Action" as a way for scientific research to be put to good use.

Mr. Hubert outlined the four main themes of the conference: Cooperation, Science, Economy, and People in the Arctic. He said that the International Polar Foundation (IPF) encourages and pursues dialogue between all Arctic stakeholders, and the changes taking place in the Arctic are a testament to the general public of the reality of global warming. These changes will affect the lives of the indigenous peoples of the Arctic as well as create new opportunities for the exploration of resources, for scientific research, and for ways to manage a fragile ecosystem. He stated that it is our duty as citizens to make sure that the symposium is all-encompassing in order to generate practical conclusions for policymakers.

He finished by thanking all the high-level distinguished speakers and moderators for being present at the symposium and sharing their vision and perspectives of the Arctic with the participants.



## NAUJA BIANCO

*DANISH SENIOR ARCTIC OFFICIAL*

Ms. Nauja Bianco focused on the recently released joint Arctic Strategy put together by the Kingdom of Denmark, which consists of Denmark, the Faroe Islands and Greenland (copies were available to symposium participants for reference, its is also available on the website of Danish Foreign Ministry). The strategy is the result of close cooperation between the governments of the three parts of the Kingdom.

The Arctic strategy was put together in order to strengthen common engagement and coordination in the development of the Arctic, which is changing at a fast pace due to climate change, (which is more dramatic in the Arctic than other parts of the planet), demographic change, and globalisation. These changes are happening as the region is opening up to the rest of the world.

The Kingdom of Denmark needed a strategy to deal with new challenges and opportunities. A changing Arctic offers new challenges in understanding how the Arctic environment is being affected, how these changes affect indigenous peoples, and how to best respond to these changes. It also offers new opportunities as the Arctic opens up for development, with increased access to oil, gas and mineral resources, as well as new shipping routes.

Changes in the Arctic have created significant international interest in the region. The Arctic has been put higher on the agendas of not only the Arctic States, but also of other non-Arctic States and polities such as the EU, Japan, China, and South Korea.

Ms. Bianco highlighted the four points outlined in the Danish strategy, which will strengthen the Kingdom of Denmark as an actor in international cooperation in handling the new challenges and opportunities. The Kingdom wishes to make sure that international decisions affecting the Arctic are made on fair and rule-based cooperation in order to protect the vital interests of all.

### **1 Before one can do anything, it is necessary to ensure a peaceful, secure and safe Arctic.**

This is the overriding goal of the Danish strategy, as without a peaceful Arctic, the other goals cannot be met. This theme was highlighted in the Nuuk Declaration. There may be a struggle for resources in the Arctic; however the Arctic nations are committed to cooperation based on international law and to solving any disputes they may have by peaceful means.

The May 2008 Ilulissat Declaration showed there is willingness to cooperate using the UN Convention on the Law of the Sea as a basis, and resolve any overlapping continental shelf claims in the Arctic using peaceful negotiations. She cited the Agreement between Russia and Norway on the delimitation of their common border in the Barents Sea as evidence that the Ilulissat Declaration is working. It has been found that 97% of the natural resources are within the Exclusive Economic zones (EEZs) of the Arctic States, so there is little in the way of resources to dispute.

Ms. Bianco applauded the Arctic Council's first legally binding agreement on search and rescue signed at the Nuuk Ministerial in May 2011. Via international institutions such as the International Maritime Organisation (IMO), the Arctic States cooperate to ensure safety at sea.

## **2 To facilitate sustained economic growth and development.**

The Kingdom also supports the sustained economic growth and development in the Arctic. The Arctic contains 13% of the undiscovered oil and 30% of the undiscovered natural gas resources (according to USGS estimates). These should be exploited for the benefit of the Arctic States and those who live in the Arctic, and to the highest international standards in terms of safety, health, the environment, preparedness, transparency and workers' rights.

However natural resources must be exploited in a way that respects the environment, and in a way that benefits the surrounding society. Living marine resources must be used in what science tells us is a sustainable way. Tourism, maritime transport infrastructure, and sustainable energy resources need to be developed. The best possible framework for export investments should be created as well, she said.

Scientific research needs to contribute to societal, cultural and economic and development as well as benefit the surrounding society. Education is an essential part of the process.

## **3 To respect the vulnerable Arctic climate, environment and nature**

It is important to understand the effects of climate change on the Arctic and the effect of the Arctic on climate change. The Kingdom of Denmark will continue scientific research and cooperate on an international level on this front, in particular via the Arctic Council. Nature and the environment must be managed using the best possible scientific research and the highest standards for protection. All threats to the Arctic environment, particularly the marine environment, should be subject to long-term monitoring and assessment, and international cooperation in this field should be strengthened in the Arctic Council and other fora.

## **4 To establish and continue close cooperation with international partners**

Some regard the Arctic as international area with no laws or rules, and some have even suggested creating a treaty for the Arctic similar to the Antarctic Treaty. However this is not feasible, as the Arctic is governed and regulated by the national laws of the sovereign Arctic States and also at an international level with comprehensive international cooperation, at a multi-lateral level in the UN, at a regional level in the Arctic Council, and bilaterally between nations. One also shouldn't forget the Arctic has been inhabited for several thousands of years, which is not the case for the Antarctica.

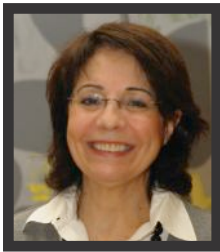
The Kingdom of Denmark will give priority to and strengthen international Arctic cooperation in all areas, including via UNEP, IMO, international climate negotiations, conventions on biodiversity, etc. Priority will also be given to improving the living conditions of Arctic indigenous peoples.

The Kingdom has favoured strengthening regional cooperation via the Arctic Council, and is glad that important decisions were made while they chaired the Arctic Council 2009 - 2011. The Arctic Council should cooperate with all nations interested in contributing to the Arctic and its development, and bilateral relations between Arctic States should be enhanced.

Ms. Bianco stated that the Kingdom of Denmark continues to support the EU's application for Arctic Council observer status, as their presence will bring added value to the continued development of the Arctic.

Given that it is based on the needs and priorities of Denmark, the Faroe Islands, and Greenland, the Kingdom's strategy until 2020 will continue to be updated and support all three parts of the Kingdom with their constructive contributions. Ms. Bianco mentioned that the Kingdom of Denmark's Arctic strategy may look like other nations' strategies, but this is a good thing, as it means all actors in the Arctic share the same interests (and thankfully, no actor wishes to increase military presence in the region).

Ms. Bianco ended by stating that there should be an Arctic Future with peaceful cooperation, without significant increase in military presence, growth and prosperity for all, protection of nature, the environment and the climate, and achieving common goals through cooperation and hard work.



## MARIA DAMANAKI

*EUROPEAN COMMISSIONER FOR MARITIME AFFAIRS AND FISHERIES*

Commissioner Damanaki started by looking at developments that had taken place in the year since she spoke at Arctic Futures one year before. There is a new urgency regarding the Arctic.

What happens in the Arctic affects the rest of the world, including the European Union. The EU's CLAMER project showed that seas in Europe are being subject to quick, unprecedented changes due to Arctic sea ice melt. This change accelerates the rise of the sea temperature and sea life migration. It also increases erosion of European coastlines. At the same time, human activity in the Arctic is increasing as Exxon and Rosneft have signed a joint agreement to carry out hydrocarbon exploration in the Arctic. She said these issues are a common concern. It is our responsibility to tackle the risks and opportunities to ensure a sustainable development of the Arctic.

The EU will continue to be a constructive and dynamic actor in carrying out EU objectives agreed in the EU Commission's Communication on the Arctic in November 2008, which outlines three objectives:

- 1 Contribute to preserving the Arctic in conjunction with the people of the region.
- 2 Promote the sustainable exploitation of natural resources, following the highest environmental and safety standards.
- 3 Contribute to enhanced governance through the implementation of relevant agreements, frameworks and arrangements.

The Commissioner said she has visited Arctic nations to discuss what they think the EU should be doing. Everyone agreed that preserving the Arctic and promoting sustainable exploitation was important. However regarding governance, she said that Arctic countries outside the EU do not want any new governance structures imposed. Commissioner Damanaki said perhaps in hindsight it would have been better to use a different word than governance, and stressed that the EU doesn't want to impose any new governance structures on the Arctic. The EU will respect the UN Convention on the Law of the Sea and the rights of the sovereign Arctic States. The EU simply wants to be aligned with what others are doing in the Arctic.

She highlighted the agreement between Norway and Russia delimiting the Barents Sea region signed in April 2010, saying this agreement demonstrates that existing structures can resolve issues without conflict, and refutes the idea of there being potential conflict in the Arctic.

Commissioner Damanaki then outlined what the EU is currently doing for the Arctic:

The EU 7<sup>th</sup> Framework Programme for research (2007- 2013) has funded 46 projects directly related to the Arctic, giving €20 million per year, looking at such things as Arctic ecosystems, glaciers, icebreaker designs, and the impacts of human activity on the region.

The Commissioner drew attention to a new project called ACCESS, which will take a multi-disciplinary and cross-sectoral holistic approach to evaluate climate impacts over the next 20 years on the entire economic activities in the Arctic, looking at marine transport, tourism, fisheries, exploitation of marine mammals, and hydrocarbon extraction.

The European Space Agency (ESA) coordinates joint European efforts to build satellites to monitor snow and ice. The Cryosat project is a good example of this; for a long time it has been possible to measure the extent of sea-ice, but with Cryosat-2 it is now possible to monitor the thickness. The EU plans to use Cryosat-2's technology for its future Sentinel satellites to be launched in the coming years. This will not only help researchers, but also help people who live in the Arctic.

She then addressed the issue of whether the EU was building on what others have done or duplicating it. The only way to find out is through better cooperation, she suggested. It makes sense to work together.

Commissioner Damanaki proceeded to address a concern regarding the EU's vision for the Arctic: It has been said that the EU wants to have more influence on Arctic. A better way of putting it, she said, is that the EU wants to ensure that what it is doing is well-aligned with the needs of those who live and work in the Arctic. The EU already influences the Arctic in many ways due to laws governing the sea, fisheries, the use of chemicals, rescue operations, and greenhouse gas emissions. Some Arctic States are EU Member States and already follow these regulations.

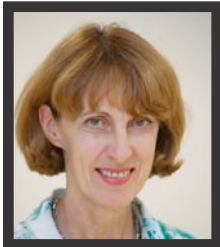
What is more important is that the Arctic should influence the EU. The EU wants more input from those who live and work in the Arctic to avoid making mistakes. The key is to get in early and to maintain a structured dialogue. Meeting with indigenous peoples, EU representatives encouraged them to look into different EU cooperation and funding mechanisms. There are EU programmes most indigenous peoples have never heard of, such as the INTERREG IV North Sámi Programme, The Kolarctic cross-border cooperation programme, the Northern Periphery Programme, and the European Instrument for Democracy and Human Rights, even though these programmes were set up for their benefit.

The Commissioner went on to stress that there is an urgent challenge to reduce carbon dioxide emissions and the EU is committed to doing so. New routes across the Arctic can cut the distance needed to travel by ship between Asia and Europe by a third. Offshore exploitation of hydrocarbons will increase. Cooperation is necessary to address how these developments will affect the people living in the Arctic and how they will affect the environment, as well as how to deal with potential accidents.

Commissioner Damanaki ended by mentioning that later in 2011 the EU Commission will report on progress made since its 2008 Communication. It will be a "launching pad" for future steps, and will include representatives of Arctic States and Indigenous Peoples in the process.



She left the audience with a quote from Charles Emmerson's book *The Future History of the Arctic*: "The Arctic has become a lens through which to view the world, and this ultimately, is why the Arctic matters."



## JACQUELINE MCGLADE

EXECUTIVE DIRECTOR, EUROPEAN ENVIRONMENT AGENCY (EEA)

### EEA: INFORMATION TOOLS AND OUR ARCTIC FUTURE

Prof. McGlade reminded her audience that six non-Arctic EU member states are permanent observers on the Arctic Council – France, Germany, the Netherlands, Poland, Spain and the UK.

She stated that the EEA follows three policy objectives:

#### 1 Information sharing

Effective ways of sharing information are important. We need to work within the 1998 Åarhus Convention (which grants the general public certain rights pertaining to access to information and public participation in governmental decision-making processes on environment-related local, national, and transboundary matters), as there are certain times when sharing information about the environment is critical. Monitoring and addressing issues related to the melting of the Arctic sea ice is one of the areas where collaboration is particularly important.

"Why should Europe be discussing Arctic Issues?" she asked. Because Europe has a big impact on the Arctic (pollution), and what happens in the Arctic affects Europe (climate change). This is why raising awareness of Arctic issues is important. It is important to build around legally binding documents. The EEA promotes legally binding documents and tries to enhance voluntary agreements.

#### 2 Implementing principles of the Shared Environmental Information System (SEIS)

This initiative is very important for the general public and indigenous peoples of the Arctic. At the UNECE Astana Ministerial 'Environment for Europe' conference 21-23 September 2011, it was agreed to implement SEIS Principles, which means that environmental information should be:

- Managed as closely as possible to its source.
- Collected once, and shared with others for many purposes (ownership of information should be at community level).
- Readily available and easily accessible (online, via smartphone, etc.).
- Accessible to enable users to make comparisons at the appropriate geographical scale.
- Fully available to the general public at a national level in relevant language(s).
- Supported though common, free open software standards.

#### 3 Investing well

We need to be able to invest in the right way in order to make information accessible for everyone. There are a lot of networks in the EU. The EEA's job is

to check that they all work together. With its European Neighbourhood Policy, Europe is responsible for enhancing this network of networks.

Prof. McGlade underscored that in the difficult economic times of the day, it is important not to duplicate research, but rather to invest well use the data properly.

In Europe there are a number of practical initiatives to share information and bring mapping together. INSPIRE legislation in Europe is one example of this. Heads of mapping agencies have agreed to bring maps together and provide the Arctic community with baseline reference maps for a near real-time exchange of information. Progress is being made. Monitoring stations from many different countries send updates on conditions on a daily and hourly basis.

Mapping is one of the problems that needs to be solved. While it hasn't been solved yet, there is a will to solve it. Reference maps are based on different technologies and there needs to be some level of harmonisation. Cooperation is the added value the EEA can bring.

Today there is a monitoring station cooperating between Russia, the US and the EU. It is providing data on forestry and air quality. Russia has agreed to move ahead on forestry, looking at land cover, land use, fires and air quality.

The EEA has been having discussions with ministers in Greenland on mining. Greenland is moving from labour economy to an economy based on resources, and how to best administer this is something that needs to be discussed, she said. Europe can offer its experience on mining politics to help Greenland set up a tax system for mining.

The EEA is also trying to promote dialogue with the indigenous peoples of the Arctic. There is a need to reach out linguistically and share knowledge. One idea is to involve them more greatly in monitoring projects, such as monitoring biodiversity.

There is a challenge in sharing information globally. Information-sharing should be very transparent. Personally collected data can be combined with nationally collected data, and real-time data overlaid with other information.

Integrating observations from citizen scientists and indigenous peoples is important. Sharing information can help communities. Connecting with young people across the Arctic is also important. Using social media such as Facebook and Twitter as a way to share information is a way they can be dynamically connected.

Prof. McGlade then mentioned a couple of information-sharing initiatives:

- GEOSS (Global Earth Observation System of Systems) – This will be a flexible global network of content providers providing an extraordinary range of information to policymakers. GEOSS will proactively link together existing and planned observing systems around the world and support the development of new systems where gaps currently exist. The GEOPortal [www.geoportal.org/web/guest/geo\\_home](http://www.geoportal.org/web/guest/geo_home) offers a single Internet access point for data.
- Eye on Earth project - This is a global public information service for sharing data and information taken from a variety of sources. The initiative is the result of a public - private partnership combining expertise from industry and public organisations. The service went online in December 2011 [www.eyeonearth.org](http://www.eyeonearth.org)

More needs to be done in Europe, due to the expertise it has available as well as the impact Europe has on the Arctic with the pollution it creates. More needs to be done to reduce pollution, in particular black carbon emissions. Stricter air quality legislation is needed to reduce black carbon emissions. Black carbon contributes to reducing

snow and ice albedo, which allows it to melt more readily. Melting ice will affect our coastlines, as it will raise sea levels.

Prof. McGlade concluded with EEA's vision for cooperation in the Arctic: "Contribute to good environmental outcomes in the Arctic through strengthened collaboration, sharing information, and support for policies in the environment, climate change, energy, transport and fisheries."



## HSB PRINCE ALBERT II OF MONACO

HSB Prince Albert II of Monaco opened his speech by mentioning that a year after the first Arctic Futures Symposium in October 2010, the event has proven its relevance and usefulness.

The Prince remarked that he was delighted that there had been progress on the concerted mobilisation of goodwill, citing the EU Parliament Resolution on Sustainable Policy in the High North of Jan 20<sup>th</sup>, 2011 as an example, as it aims to create conditions for sustainable development and takes into consideration the people who live in the Arctic while working together in a spirit of dialogue and peace. While the EU is the largest consumer of Arctic natural resources, the EU and its Member States are also the primary providers of funding for Arctic research.

He noted the growing interest in the Arctic from non-Arctic States such as South Korea, Japan, China, Italy and Singapore, all of whom want permanent observer status on the Arctic Council. This interest is related to emerging business opportunities in the region. "Should we deplore this?" asked the Prince. No, we shouldn't he said; economic development isn't necessarily the enemy of ecology.

The economic prospects of the Arctic are undeniable, and development is inevitable. He advised that it would be dangerous to ignore the reality of the growth of commercial activities in the Arctic. It is imperative to "support and supervise" development rather than condemn it.

Economic interest in the Arctic will make it possible to obtain new political and economic resources, he said. By asking the right questions now, the decision-making process, which can often be "too long and too involved", can be accelerated. He cited the legally binding search and rescue agreement signed at the Nuuk Ministerial as an example of a decisive step forward. The way to move forward, he said, is to concentrate on "issues that may seem limited, but which have important consequences."

However given the vast and complex challenges of the Arctic and states which may at times have divergent interests, there will not be "a single solution" that protects the welfare of the Arctic peoples, protects natural resources and ensures development of economic activity. Rather than embarking on negotiations for a hypothetical Arctic Treaty HSB Prince Albert II of Monaco said that it is better to work on solutions on a case-by-case basis – to make progress, albeit modestly, taking small steps, similar to the way the European Union was constructed.

The Prince cited marine protected areas as a good, meaningful example of a small step that can be taken which has a major consequence, as it addresses economic needs and environmental requirements while respecting local realities.

The success of Marine protected areas is due to three factors:

- Ecological benefit through the protection and regeneration of natural heritage.

- Economic relevance, as underwater reserves closed to fishing will help to increase the number of fish as well as their size and reproductive capabilities.
- Cultural attraction related to scientific, touristic and educational activities.

This is the reason why the Prince works so hard advocating marine protected areas. The Arctic needs more protection than any other region. One need only think of implications a serious industrial accident would have on this area. More than elsewhere our role is therefore to protect as large an area as possible. This, however, does not prevent supervised sustainable development in other areas. The Prince mentioned that during the conference in Arkhangelsk, Russia in September 2011, he discussed with the Russian authorities and in particular with Prime Minister Vladimir Putin the idea of setting up marine protected areas in former militarised zones relatively untouched by commercial fishing activities.

Citing the need to be bold, imaginative and ambitious in finding solutions, the Prince brought up the Monaco Blue Initiative, a project that brings together political, scientific and business leaders to find ways to protect the oceans.

As we are faced with a challenge of combining economic ambitions and ecological objectives, he said it is imperative to act through dialogue while involving all who are concerned.

In conclusion, the Prince quoted Jean Monnet: “We only have the choice between the changes we are forced to make and those we wanted and were able to achieve.” His point was that we must remain the masters of the changes that await us. In order to do this, we must increase scientific research and find solutions, while remaining aware of the need to be effective. We must encourage debate and consultation while remaining aware of the need for dialogue. We must be bold and inventive, while remaining aware of the need for openness.



# PERSPECTIVES FROM ARCTIC COUNCIL NATIONS (PART 1)

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MODERATOR:

**KARSTEN KLEPSVIK**

*NORWEGIAN AMBASSADOR TO THE ARCTIC COUNCIL*



Ambassador Klepsvik opened the session by giving a definition of the Arctic. A common definition is the region where the average temperature in July stays below 10°C. He stated that the Arctic is 28 million km<sup>2</sup>. It has 18 million km<sup>2</sup> of ocean, and 4 million people live there.

He mentioned the huge amount of natural resources in the Arctic, most of which belong to Russia, and the rest shared by the four other Arctic coastal states. Once the delimitation of Arctic territories has been sorted out – which might take some time – at least 90% of the national resources in the Arctic will be under national jurisdictions. Norway has established the extent of its continental shelf; the other nations still must deliver their submissions to the UN Continental Shelf Commission.

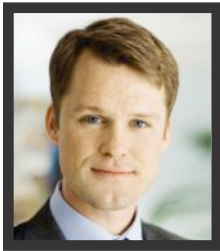
The Arctic is becoming more accessible due to melting ice. The region is opening up for science, tourism, natural resource extraction (oil and gas, fish stocks), and maritime transport. During winter, the Arctic is normally covered by about 17 million km<sup>2</sup> of sea ice; the summer of 2011 saw Arctic sea ice covered by less than 5 million km<sup>2</sup>. The region may become ice free in the summer in less than two or three decades, and the remaining ice gets thinner and thinner.

While some might think there is potential for military conflict in the Arctic, Ambassador Klepsvik said this will not happen. The Ambassador said there is also no need for an Arctic Treaty. Arctic coastal nations have national jurisdiction over their territories and their continental shelves. What is left is under the jurisdiction of the International Seabed Authority in Kingston, Jamaica, which would have the authority to grant licences for commercial activities. He said that it is unlikely that there will ever be any fisheries so far north.

Regarding the United Nations Convention of the Law of the Sea itself, Ambassador Klepsvik said there was no need for any new treaties, but that there might be a need for new rules and regulations based on existing treaties.

The Arctic Council is the only multinational circumpolar organisation to address pan-Arctic issues, said the Ambassador, underscoring that while it is not a political decision-making authority, it is a decision-shaping authority, which will in the future likely make more binding decisions similar to the Nuuk Declaration on Search and Rescue in the Arctic.

He concluded his introduction by stating that there is increased interest from other countries who want to become observers on the Arctic Council such as China, the EU, Japan, South Korea, and Italy in addition to the six permanent observers to the Arctic Council and indigenous group representatives. Ambassador Klepsvik stated that he believes the other countries have a valid interest in the Arctic, and they should not have to address these interests outside the Arctic Council.



## GUSTAF LIND

*SWEDISH AMBASSADOR TO THE ARCTIC; CURRENT CHAIRMAN OF THE ARCTIC COUNCIL*

### ROADMAP FOR THE SWEDISH CHAIRMANSHIP OF THE ARCTIC COUNCIL

Ambassador Lind opened by stating that right now is a very important time in the development of the Arctic Council. Looking back on its 15-year history, the Arctic Council has produced some groundbreaking assessments, such as the Arctic Climate Impact Assessment (ACIA), Arctic Marine Shipping Assessment (AMSA), and its oil and gas assessments. They have provided an understanding of the dynamic development in the Arctic and formed the basis of the Arctic States' activities and views in the Arctic.

The Arctic Council has developed as the hub of Arctic cooperation, the Ambassador said. But now, in its dynamic period of development, the Arctic Council needs to discuss how to move from a decision-shaping forum to a decision-making body. Referring to a point HSH Prince Albert II had made earlier about the need for taking small steps in the Arctic, he argued that some recent steps have actually been quite big. The first example is the Search and Rescue agreement signed in Nuuk, which shows that Arctic Council can adopt binding decisions. The Nuuk meeting strengthened Arctic Council decision-making, established a budget and established a standing Secretariat in Tromsø, Norway. It has given the Arctic Council greater stability and capacity to assume its role as a hub of Arctic operations.

The Ambassador mentioned that Sweden is chairing the Arctic Council at an important time, and that it must take steps large and small to be ready for increased activity in the Arctic and to facilitate cooperation.

He then outlined in four points on how the Arctic Council should work:

- 1 It should focus more on concrete decisions (legally binding agreements, recommendations that are implemented) that bring added value to the Arctic and make a difference.
- 2 It should more clearly express the common interests and common policies of the Arctic States, as individual states' policies are quite similar. All focus on the environment, research, sustainable economic development and the peoples living in the Arctic. The Arctic States should use the Arctic Council as a platform to show how they want to develop the Arctic, as the media doesn't always give the right image of what is happening.
- 3 It needs to be more alert and respond more quickly to current events. The council needs to change dynamically and rapidly as the Arctic changes.
- 4 The Arctic Council needs to improve its communication. Quoting Steve Jobs, Ambassador Lind stressed it is more important to live communications plans than to simply send out a press release. Blogs, tweets, and the Arctic Council website need to reach out with messages.

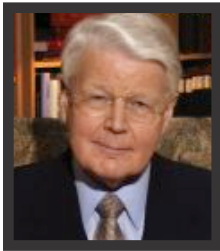
Ambassador Lind then summarised what needs to be done to move forward:

- There needs to be prevention and response plans in the case of an oil spill. Development of transport is a key priority for the people living in the Arctic, as well as industries, environmentalists and the general public. This can be done on two levels: Focusing on the prevention of oil spills by implementing the highest standards for transport and focusing on readiness. Arctic States must have an established system to respond effectively together, and there needs to be an established instrument to make this happen (Ambassador Lind highlighted the

meeting in Oslo on Oil Spill Response taking place the following week 17 - 21 October as a forum for discussion).

- With climate change affecting the Arctic more than the rest of the world (the region is warming at a rate 2.5 times faster than the global average), the UN climate negotiations are key, and the Arctic can be shown as an example of how warming impacts a particular region. Yet more can be done regionally, he said (one shouldn't pin all hopes on international climate talks to reach an international agreement). Focusing on reducing short-term climate forcing such as black carbon emissions can have a direct and short-term positive effect.
- Business needs to be developed - sustainably. The Arctic is home to four million people and the Arctic Council should focus more on the people who live there. These are fragile societies living in a fragile region. There needs to be jobs and economic development, although development should be sustainable and balanced. Ambassador Lind wants to create dialogue between Arctic States and businesses on these issues.
- Food security and food safety are important issues indigenous residents of the Arctic face. Climate change may change the environment, making it more difficult to have access to water, or to hunt, fish and rear animals that are traditional sources of sustenance such as seals, whales and reindeer. High levels of toxins found in the plants and animals people consume in the Arctic are also a threat to human health.
- Assessments will be an important part of the Swedish Chairmanship of the Arctic Council as well. A number of assessments will be started and the results of previous assessments will be presented during their chairmanship. The assessments must have a broad and integrated perspective of the Arctic in order to understand how all the different drivers in the Arctic interact. Results of assessments on Arctic biodiversity, the legal framework for the Arctic marine environment, and the acidification of Arctic waters will be published.
- Ambassador Lind said he wanted to strengthen the Arctic Council by strengthening its institutions.

The Ambassador concluded by saying that by the time the Arctic Council Ministerial takes place in Kiruna, Sweden in May 2013, when the Canadians will take over Chairmanship of the Arctic Council, he hopes that the Swedish Chairmanship will be seen as an effective chairmanship, having delivered concrete change when it comes to the environment, having addressed important issues of the people living in the Arctic, and having strengthened the Arctic Council.



## ÓLAFUR RAGNAR GRÍMSSON

*PRESIDENT OF ICELAND*

### ICELAND AND THE NEW ARCTIC: CHALLENGES AND OPPORTUNITIES

President Grímsson stated that the Arctic has moved to centre stage. The region is crucial to the future of the world for energy production, global transport, monitoring climate change and the well-being of those who rely on the ocean for survival. The Arctic has become the new intellectual frontier calling for research, discovery and cooperation.

What has happened in the Arctic over the past few years has resulted in the establishment of a new political system that previously did not exist before in this part of the world: the New North. This includes not just the Arctic Council, but also an interlocking network of systematic consultation mechanisms linking all of the Arctic nations and those living in the Arctic region in multidimensional political cooperation.

The federal structures of Russia, Canada and the US have made it possible for regional, provincial and state governments to cooperate with smaller nation-states in the North. They have also enabled old diplomatic rules about who can cooperate with whom to be surpassed. There is a new way of solving problems, and it is highly democratic, the President said. It is possible to come forward in an open way with plans and proposals and the Arctic is full of discussions and dialogues. This way of working has opened the way for many forward-looking meetings.

“So why have we not made progress?” President Grímsson asked. There is no excuse.

New opportunities for development are opening up at the same time as the threat of climate change faces us. President Grímsson warned that time is short for producing concrete and effective solutions. A failure to reach agreement on reducing carbon emissions at an international level will leave open the possibility of a catastrophic-scale man-made disaster. The Arctic’s fate is the fate of the rest of the world as well. Arctic countries need to prepare themselves for an aggressive melting of ice. An agreement won’t prevent what might happen in the Arctic in the next 30-40 years.

Underscoring commonalities the Arctic has with other parts of the world, the President mentioned researchers from the Himalayan region joined colleagues from the Arctic nations at the Northern Research Forum’s Open Assembly in Iceland in the first Arctic-Himalayan dialogue. The threat of melting glaciers in the Himalayas is similar to the threat of melting ice in the Arctic.

He cited the growing interest of rising countries such as India and China in the Arctic. During their visit to Iceland, a delegation from the Chinese Polar Institute discussed their plan to send the Chinese icebreaker *Snow Dragon* from China across the Arctic to Iceland during the summer of 2012 in order to highlight the reality of climate change as well as the need for constructive engagement and cooperation.

Underscoring how much the Arctic has become a pillar in Iceland’s foreign policy in recent years, the President mentioned the Icelandic Government has passed a resolution that will concentrate on efforts that increase economic activity and ensure that this will take place in a way that does not compromise environmental or social values.

The President emphasized the importance of the relationship between Greenland and Iceland, which has been able to develop thanks to multi-dimensional networks of cooperation. The fate of Iceland and Greenland are closely interlinked, as they are close neighbours. Citing a number of areas of interlinkage between the two countries, such as cooperation on air transport, the Icelandic health system serving communities



in Greenland, and the universities of Nuuk and Reykjavik jointly hosting a meeting on international polar law, President Grímsson argued that the cooperation between Iceland and Greenland can serve as a model to other Arctic States.

On a related point, the President posited that development of the Arctic's resources will bring challenges. He argued that no one has the right to deny indigenous peoples their right to develop economically. The challenge is to find a way to harmonise both conservation of the environment and economic and social progress of indigenous communities.

On the need for innovative solutions to energy needs, President Grímsson mentioned that Norway and Iceland are pioneering the development of clean energy and suggested that the EU should look to them as an example. Several decades ago, Iceland used to rely on oil and gas imports to meet 80% of their energy needs. Back then, the population was not well off economically. However, since then, Iceland has moved towards energy independence through the use of clean geothermal energy and heating, and the country has become a magnet for foreign investment for industries with energy-intensive operations such as aluminium smelting and data storage. The President has initiated discussions on using geothermal energy in Alaska and Russia for not only industry, but also for providing energy and heat to villages, or tourist attractions such as spas and swimming pools. Greenhouse agriculture, fish farming, and many other economic activities are also concrete economic opportunities for many Arctic countries in coming years.

Hydropower is another area that offers opportunities. Greenland is very rich in hydropower. It is the largest untapped source of hydropower. Greenland could provide energy to Europe and North America. It is possible to lay cables underwater to connect energy sources in the Arctic to areas further south. Clean energy and the sustainable use of natural resources can be the backbone of revitalising the economies of Arctic regions, he argued.

Regarding the issue of fishing, President Grímsson emphasised the importance of fish stocks in the Arctic. Fish stocks are migrating due to climate change, and this has led to political difficulties, such as the disagreement between Iceland, Norway and the EU over mackerel breeding grounds. The President mentioned that Icelandic scientists had shown that the largest part of the breeding grounds lie within Iceland's Exclusive Economic Zone (EEZ). This dispute highlights that Arctic waters are home to some of the most important fish stocks in the world, and an effective solution needs to be in place to deal with these kinds of issues; otherwise we risk destroying these fish stocks.

Powerful corporate interests from elsewhere are knocking on the door of Arctic nations, the President said, and decisions must be taken. There are consequences of opening the Northern Sea Route, and we need to find ways to deal with complicated challenges, the threat of pollution, and building adequate harbours. We need to analyse infrastructure. President Grímsson welcomes strong leadership from Russia in this area.

Iceland is preparing to enlarge its harbours as the use of Arctic travel routes would make Iceland a convenient transportation hub for ships. The country is also preparing for oil exploration off the northeast coast of Iceland on the Jan Massen Islands.

The President remarked that through the Arctic Council, it is possible to develop policies based on the findings of scientific research. The future of the Arctic will not be secure unless science is used as a basis for developing policies.

President Grímsson ended by saying that "Fate has made us guardians of one of most beautiful and fragile places on Earth." The people of the Arctic and global citizens have a responsibility to all mankind.

Following President Grímsson's talk, Ambassador Klepšvik responded to the President's comment on fisheries in the Arctic, clarifying that his comment was that scientific conclusions indicate that in the foreseeable future, there are not likely to be any commercial fisheries in the Arctic Ocean. He was not referring to the mackerel fishing quota dispute between Iceland, Norway and the EU in the North Atlantic. While he said he sees no need for immediate action regarding managing fisheries that do not yet exist in the high Arctic Ocean, Ambassador Klepšvik called for cooperating rationally in managing fisheries in all parts of the world.



## INUUTEQ HOLM OLSEN

*DEPUTY FOREIGN MINISTER OF GREENLAND*

### SOCIAL AND ECONOMIC PERSPECTIVES FOR GREENLAND IN THE 21ST CENTURY

Inuuteq Holm Olsen focused on the motivation and political goals of Greenland in its bid to become an independent nation. Greenland will concentrate on economic growth and development, putting a strong emphasis on education.

Greenland has had a longstanding wish to be responsible for its own affairs. In 2009, a new self-governance act was passed, which provides the foundation for the work Greenland hopes to accomplish in moving towards independence. The act states that the people of Greenland have the right of self-determination under international law. It also includes language for the process of future secession from Denmark, and a list of 33 areas of governance transferred from Denmark to the Government of Greenland.

One of the areas in which Greenland gained autonomy from Denmark is control of its mineral resources in January 2010. The key objective is to become financially self-sufficient, removing the need for the €450 million monetary grant Greenland receives from Denmark each year. The country is also developing its energy and mineral sector, as well as its education sector.

The Deputy Foreign Minister mentioned there has been growing international interest in mineral, oil and gas resources in Greenland. The government has granted 20 licenses for exploratory drilling for oil and gas. After granting seven new licenses for exploration in Baffin Bay, the next area up for tender in 2012 will be in the Greenland Sea.

Greenland is also in the process of developing its hydropower potential to provide electricity. It is projected that in 2012, 60% of the Greenlandic population will receive its electricity from hydropower.

There has been some oil and gas exploration off the coast of west Greenland. Nothing has been found so far, but there are indications that there are resources there. If there are resources, "this may be the last step towards a self-sustaining economy," Deputy Foreign Minister Olsen said.

Regarding those who see the Arctic as a nature reserve to be preserved at all costs, the Deputy Foreign Minister stressed that those who live in Greenland are the most concerned with health and safety issues. He stressed that Greenlanders are aware of environmental risks related to the development of natural resources, and no one wants to destroy the environment. The main challenge is to combine resource development with environmental protection and come up with complementary solutions. Greenland has some of the strictest environmental standards regarding oil and gas exploration, and will continue to develop rules and regulations to protect the environment, but not for the sake of prohibiting resource exploitation.

The Deputy Foreign Minister said he welcomes a continued focus on improving practices and standards as better knowledge and new technologies become

available, and underscored that environmental leadership is paramount in the Arctic in conjunction with resource development. He hoped that the creation of an Arctic Council Task Force to develop an international instrument on oil spill preparedness and response will be a step forward in setting high standards across the Arctic in this field. He also said Greenland would like to see additional measures include the establishment of an international liability and compensation fund for oil pollution damage resulting from offshore oil exploration and exploitation in addition to all the national obligations already in place.

In the minerals sector, Deputy Foreign Minister Olsen mentioned projects to develop iron, zinc and rare Earth mineral resources. They have entered a new phase, with profitability studies to be finalised by the end of 2011. In order to turn mineral exportation into a long-term business sector, it is important that numerous exploration projects be ongoing, as development projects have a long-term horizon, and only a few actually become operational. In 2010, Greenland granted 40 new mineral exploration licences, bringing the total of licences granted to 120 to date. He said it is hoped that in the next 5-10 years, at least five mines will become active, employing more than 1,000 residents in this industry.

Turning to the subject of education in Greenland, Deputy Minister Olsen said that when Greenland took over responsibility for educating its public in 1979, it was an area in dire need of reform. As a key part of Greenland's move towards independence, the goal is to strengthen the educational sector qualitatively as well as quantitatively. Greenland is currently implementing the 2005-2020 strategy adopted by the Greenlandic Parliament and receiving funding under the EU via their partnership agreement, with the goal of strengthening the position of Greenland in a globalised world.

The primary goal of the programme is to have two thirds of the Greenlandic work force with a formal education by 2020. The plan involves developing isolated areas of Greenland, strengthening families' opportunities and social mobility, and strengthening individuals' self-confidence and cultural identity.

The programme has two phases: Firstly, focus on kids who might drop out of school, and secondly on the unskilled adult labour force under 50 who are unemployed or are in vulnerable industries. Targeting these groups provides the greatest advantages. The programme also targets sectors that carry the weight of economic growth or have a high demand for specialised manpower in the public sector, tourism, mineral resources, health and human services, education, and construction.

The Deputy foreign Minister said the programme is working. Vocational training for students from 2005 to 2010 has seen a 35% increase in the number of students, a 25% increase in the number of apprenticeships, and a 30% increase in the number of students who complete an educational programme. High school enrolment has increased 42%, the number of students completing high school has gone up by 61%, and the number of students enrolled in higher education has increased 33%.

There are still challenges, however. There is a 23% school dropout rate, and providing necessary educational infrastructure, including student housing. Yet with all the challenges facing Greenland, education is essential to focus on. Citing Iceland as an example of a country that has gone through what Greenland is currently going through and as a source of inspiration, he said that Iceland's experience shows how important it is to improve education and that developing both human and natural resources is a key step to achieving Greenland's long-term goal of political and economic independence.

## DISCUSSION

The first question from Dr. Olav Orheim of the National Research Council of Norway was directed at Inuuteq Holm Olsen in regards to how Greenland is going to address the challenge of managing the large number of international companies looking to exploit natural resources in Greenland, given the vast area of Greenland and limited human resources available.

Deputy Foreign Minister Olsen responded that Greenlanders know what they want, and this helps them to set goals. While some may be concerned about foreign mineral exploitation companies coming to Greenland, the country needs foreign direct investment in order to develop its economic future. Knowing where weaknesses lie can help them be addressed, as well as where to step in to regulate foreign companies. The Deputy Minister said that Greenlandic authorities do this on a case-by-case, first come, first served basis.

Mineral resource development is an issue that commercial actors decide – for example, whether prices are ok with respect to the worldwide market. Greenland cannot have control over everything.

Prof. Konrad Steffen from the University of Colorado, Boulder and World Climate Research Programme (WCRP) Chair noted how the speakers were talking about the changes in the Arctic and the need to know more about what's happening. He said that international research programmes are a good platform for collaboration, and urged the politicians present to consider their importance. He pointed out the logistical needs of these research programmes (in terms of research vessels, helicopters, etc.) and the support they need from the EU, the US, Russia and other governments to keep these programmes running. There are opportunities out there, and we must take advantage of them, he said.

Eric Turner from the AECOM Technology Corporation asked whether there needs to be an extra degree of pollution control and security in place for everyday operations in the Arctic as the region develops.

Deputy Foreign Minister Olsen said that there were very strict standards in place in Greenland. The country has also been cooperating with Norway, which has a great expertise in oil and gas exploitation. Greenland employs Norway's standards, as well as the Arctic Code when it comes to shipping and ships involved in the exploration process, even though it's not mandatory.

He said all contingency plans and environmental protection guidelines are available at the Bureau of Minerals and Petroleum Website [www.bmp.gl](http://www.bmp.gl). Before any license is given for exploratory drilling in Greenland, the government does a thorough background check into the company's environmental standards, and requires them to provide a contingency plan in case there's an oil spill and have at least \$10 billion USD in reserve in case they have to clean up a spill.

Ambassador Lind added that each Arctic state decides on the level of environmental regulation it wants to employ. Yet each nation state is obliged to adhere to certain international standards in certain areas. The question is whether Arctic States should set their standards based on international rules, or whether in cases where there are no international rules for a specific area, to make groundbreaking regulation of their own. He said that at the meeting in Oslo looking at Oil Spill Response the following week (17-21 October). They plan to set the first standards for oil spill prevention, as well as hold preliminary discussions on possible oil spill response instruments. He said things would be clearer after the working groups looking at this issue reach their conclusions.



President Grímsson then pointed out that there is a strong realization among the Arctic States that we can all benefit strongly from cooperating with each other in preventing environmental disasters in the exploitation of natural resources, and he said the hoped this would be the next big step, using the Arctic Council as an instrument for agreements that will be – at least to some extent if not completely – binding. It is a new area for everyone. No one has the perfect formula to prevent disasters or what to do if they happen, and we must come to terms with this. He said that conferences like Arctic Futures and others where experts and all Arctic stakeholders are invited into the discussion play an important role in the decision-making process.

Addressing Prof. Steffen's comment on the need for logistical support for scientific research expeditions, President Grímsson said there is a lack of awareness on the need for investment in scientific research infrastructure. This is perhaps why the Chinese have made a claim to be a prominent player in the Arctic, because they are building the infrastructure and undertaking expeditions in the Arctic. We shouldn't shut the Chinese out of the Arctic, the President said. The Chinese have already done four expeditions to the region, and a Chinese delegation visited Iceland twice in 2011 to discuss setting up an observer station in Iceland as a base from which to conduct research. The President said they have very legitimate scientific interests, and that Iceland has the same concerns. The US faces the biggest question in terms of financing scientific research.

The President then moved the discussion to a topic that had not been brought up: the increased frequency of tourist cruise ships in the Arctic. The possibility of having a cruise ship accident in the Arctic is enormous, and it entails environmental consequences in addition to the danger for the people on the ship. Regulating passenger ship traffic in the Arctic should also be put on the agenda, he said. So far we have been lucky that there has not been any accident.

Ambassador Klepšvik said this and all the other issues that were mentioned during the discussion are on the agenda of the Arctic Council. He added that much more can be done on an international level. Regarding shipping, the Ambassador said that the International Maritime Organisation (IMO) is in the process of adopting a mandatory code for polar ships, although it won't be in place before 2013. However it will put in place many new provisions for shipping in the Arctic and Antarctic. It takes times to get new rules and regulations in place, but they are coming, he said.

Geir Tommy Pedersen from the Sámi Council said he would have liked to address the comments Commissioner Damanaki and Prof. McGlade made about the EU's role in the Arctic. He said he is well aware of the rush for resources in the Arctic, in areas which are home to indigenous peoples, and commented that indigenous peoples don't always feel they are always able to have a say on certain issues in certain situations. He posed the question of how indigenous peoples might be included more in the decision-making process in the Arctic.

President Grímsson responded by stating that he gets worried when people say there are "only" 4 million people in the Arctic; they all have the same human rights as anyone else on the planet regardless of whether they are 4 million or 200 million. The President asked if the Arctic States, as democratic states and as defenders of human rights, are willing to give indigenous peoples of the Arctic a fundamental voice in the decision-making process in the Arctic. He said that indigenous peoples are in the position to demand it, and this is why the legal debate on the Arctic is far from over.

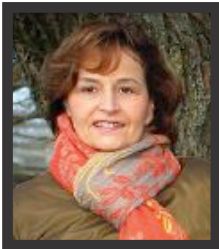
# PERSPECTIVES FROM ARCTIC COUNCIL NATIONS (PART 2)

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MODERATOR:

**ANNELI JÄÄTTEENMÄKI**

*FINNISH MEP; FORMER PRIME MINISTER OF FINLAND*



Before introducing the speakers, Anneli Jäätteenmäki began the session by briefly reminding everyone of the EU's interest in getting more involved in the Arctic and highlighting the importance the EU places on taking into consideration points of view from outside the EU.

**CAROLINE BROUN**

*ECONOMIC OFFICER FOR ENVIRONMENT, SCIENCE AND TECHNOLOGY, UNITED STATES MISSION TO THE EUROPEAN UNION*



## US PRIORITIES IN THE ARCTIC

At the start of the presentation, Caroline Broun mentioned that a theme of the Arctic Futures Symposium seems to be everyone working together at all levels of government, in civil society, and within the scientific community.

Her presentation focused primarily on giving a summary of where things currently stand with the Arctic Council. She offered a brief background on the Arctic Council, mentioning that it was founded in 1996 and meets every two years at the foreign ministerial level.

She then listed some of the important deliverables from the last Arctic Council Ministerial in Nuuk in May 2011:

- It was agreed that an Arctic Council Standing Secretariat be formed and be located in Tromsø, Norway. It is set to open in spring 2013. Chairmanships of this Secretariat will still rotate every two years between the Arctic Council member nations.
- Funds have been approved for translation of documents into Russian (until recently, translation into languages other than English had been done on an ad hoc basis).
- Clear criteria for those wishing to become observers on the Arctic Council have been established.
- The agreement on cooperation in Aeronautical and Maritime Search and Rescue in the Arctic was signed. It is the first legally binding agreement negotiated under auspices of the Arctic Council. The US and Russia were co-chairs. The search and rescue agreement divides Arctic into several regions and each nation takes

responsibility on search and rescue in its designated sector, regardless of the nationality or status of those in need.

- The Arctic Council released its Snow, Water, Ice and Permafrost in the Arctic (SWIPA) assessment <http://www.amap.no/swipa>. However it leaves a number of big, unanswered questions such as “what will happen to Arctic Ocean ecosystems as freshwater from melting land ice flows in?”
- The US and Norway co-led a task force on black carbon and recommended mitigation options. Transportation (especially diesel engines), residential heating, open burning and shipping are the main contributors to black carbon pollution in the Arctic.
- The Arctic Biodiversity Trends Assessment 2010 report was published [www.caff.org](http://www.caff.org).

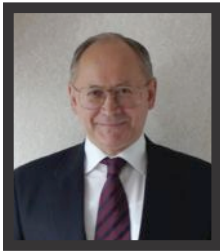
Ms. Broun then outlined some new initiatives of the Arctic Council, which tackle a broad spectrum of issues:

- Oil Spill Preparedness and Response Task Force, with the US and Russia co-leaders.
- Enhanced Oil Spill Prevention work from the Emergency Prevention, Preparedness and Response (EPPR) working group.
- Ecosystem-based management expert group.
- Sustaining Arctic Observing Networks (SAON).
- Arctic Ocean Acidification.
- Arctic Human Development Report II – looking at the relationship between physical processes and social change.
- Food security and access to good, quality sources of water (this is a priority of the Swedish Chairmanship of the Arctic Council).

She finished by mentioning initiatives currently under consideration:

- The Arctic Change Assessment – a comprehensive cross-cutting synthesis looking at changes affecting Arctic.
- The Arctic Resilience Project.
- The Arctic Maritime and Aviation Transportation Infrastructure Initiative.
- The International Polar Decade initiative 2015-2025 to be led by the World Meteorological Organisation (WMO).

Ms. Broun ended by emphasizing that as a full member itself, the US supports the work of the Arctic Council and promotes the work of its working groups.



## ANTON VASILIEV

*AMBASSADOR AT LARGE, SENIOR ARCTIC OFFICIAL OF THE RUSSIAN FEDERATION*

### THE RUSSIAN PERSPECTIVE ON INTERNATIONAL COOPERATION IN THE ARCTIC

Ambassador Vasiliev began his presentation by reminding the audience that the political and strategic situation in the Arctic has changed due to the end of the Cold War, technological progress, and climate change.

The prospect of nuclear conflict between major superpowers has now receded. In the two decades since the Cold War has ended, there has been greater stability and predictability. The Arctic is no longer a battlefield. The Arctic is witnessing growing cooperation, and technological advances have made it possible to travel to the North Pole beneath the sea ice.

The Ambassador pointed out that in 2008 Russia was the first to adopt a new national Arctic strategy in response to the new realities of the Arctic.

The Russian strategy outlines fundamental interests in the North:

- 1 Extracting resources.
- 2 Maintaining peace stability and cooperation in the region.
- 3 Protecting fragile ecosystems and the interests of indigenous peoples.
- 4 Exploiting the potential of the Northern Sea Route.

The other seven Arctic States have since devised their own strategies. While there are similarities in all eight, the most common point is that each country's national interests can only be met through close cooperation with the other Arctic States.

The Ambassador pointed out that the Arctic nations do not have any problems that would require resorting to military force or the creation of military blocs. EU security interests are not at stake either.

He noted that from time to time there are "temptations" to apply the pattern of Arctic cooperation today to other less stable areas of the world. It should not be assumed that this will work, he said, as unique circumstances exist in the Arctic.

Ambassador Vasiliev then highlighted that the five Arctic States strictly follow 2008 Ilulissat Declaration, which states that overlapping claims are to be solved via negotiations based on the existing and sufficient international legal framework. Norway was the first to submit its claims to the UN Commission on the Limits of the Continental Shelf and have them approved in 2009. Their claims were resolved without any bloodshed. He also cited the Barents Sea maritime boundary agreement between Russia and Norway as an example that it is possible to find peaceful and acceptable solutions to disputes.

Everyone follows the same rules. Continental shelf claims must be proven scientifically. More data is needed for Russia's submission to the UN International Seabed Authority in order to substantiate its claims on the continental shelf it made in 2001. The Seabed Authority accepts no overlapping submissions.

He mentioned that experts from the five nations that border the Arctic Ocean are in regular contact with each other. There is very little ground for conflict, as there is very little left to divide: 95% of the Arctic's resources have already been allocated.



He remarked that doomsday scenarios for the Arctic come from a lack of knowledge about the realities of the region, or from self-serving interests. These scenarios are not coming from the Arctic but from those outside the Arctic.

Political cooperation is developing very fast. While we are only taking the first steps on a number of issues, there is still an enormous potential for future cooperation. The Ambassador cited scientific research, mitigation and adaptation to climate change, protection of the environment and biodiversity, elimination of pollutants, preserving the culture of indigenous Arctic peoples, healthcare, sustainable development and education as examples.

Russia is working with other Arctic partners on regional frameworks. He highlighted the large number of Arctic projects the Arctic Council, the Barents/Euro Arctic Council, and the EU are undertaking at the moment. Ambassador Vasiliev however emphasised that the Arctic Council is a “key institution” for Arctic cooperation, and mentioned that it should co-exist with other structures wherever they exist, on a regional or bilateral basis. Other structures do not weaken the Arctic Council.

He mentioned the establishment of an Arctic Council secretariat with its own budget, the binding agreement on search and rescue signed at the Nuuk Ministerial, and the decision on the role of observers as decisions that have strengthened the Arctic Council.

Ambassador Vasiliev then discussed the growing importance of the Northern Sea Route (NSR). He mentioned 2 million tons of cargo was shipped along the NSR in 2010, with the figure expected to grow to 60-65 million tons of cargo by 2020 and 85 million by 2030. To prepare, Russia is constructing new icebreakers, establishing 10 modern search and rescue monitoring and coordination centres, and modernising its port infrastructure.

Citing Gazprom’s plan to drill in the Pechora Sea and recent agreements Russia has signed with Rosneft and Exxon Mobil, Ambassador Vasiliev emphasized the importance of oil and gas activities in the Arctic as “one of the key areas of international cooperation.” The Ambassador also said the Arctic is becoming a source of future business opportunities, and that the Arctic Council should play a role in helping to build direct business contacts. Russia is preparing to have an Arctic Expo in 2015 in Salekhard, which will aim to foster business ties in the Arctic.

Proclaiming Russia’s commitment to environmentally sound development, the Ambassador stated that development will occur under strict environmental standards. He said there are a lot of projects, but Russia needs greater cooperation in research. Nordic technology is useful, mentioning the recent signing of an agreement with the Nordic Environment Finance Corporation (NEFCO) with Russia’s €10 million contribution to the Arctic Council Project Support Instrument to assist with the cleanup of contamination in their part of the Arctic

Ambassador Vasiliev also called for more coordinated and systematic research in order to better understand long-term changes taking place in the Arctic so better decisions can be made. He re-iterated Russia’s support for the International Polar Decade (IPD) 2015-2025, which will build on the achievements of the International Polar Year (IPY) 2007-2008. He also called for greater innovation in fields such as technology, energy efficiency, communications, navigation, search and rescue, space, cross-polar aviation, culture, tourism and education.

The Ambassador concluded by telling the audience that Russia believes the signs are pointing towards greater cooperation in the Arctic. There is no trend towards Arctic isolationism. The Arctic is interested in mutually rewarding relationships with non-Arctic players; however the rules will be set by the Arctic States.

The Arctic is “our home”, said the Ambassador. It is not an isolated wilderness. The region has global links. It is not a lawless jungle, but rather an area of peace, predictability, cooperation and dialogue.

The idea that people outside the Arctic know what should be done is sometimes met with concern, perhaps with suspicion that others might be interested in undercutting the competitive edge of the Arctic States and grabbing their own piece of the Arctic riches. However through greater dialogue and cooperation, he believes that such attempts will be dissolved and there will be a clearer picture of the Arctic and its realities.



## ALAIN HAUSSEUR

*DEPUTY HEAD OF MISSION AND ACTING CHARGÉ, MISSION OF CANADA TO THE EU*

### CANADIAN PERSPECTIVES ON THE ARCTIC

Canada is an Arctic nation, and the Arctic is a fundamental aspect of Canada's identity, said Mr. Hausseur. About 40% of Canadian territory lies within the Arctic and 100,000 of its citizens live there, many of them indigenous. The region has an enormous unlocked economic potential.

The Government of Canada launched its Northern Strategy in 2009, which encompasses four axes:

- 1 Strengthening sovereignty.
- 2 Looking after the environment.
- 3 Economic and social development.
- 4 Investing in infrastructure to attract development in the North (one example is the deep sea port to be constructed in Churchill, Manitoba).

The indigenous peoples of Canada's North are integrated into the process.

Mr. Hausseur said that Canada wants to develop in a sustainable way, and that they have been at the forefront of environmental protection since the 1970s. He cited some examples:

- Coverage of the Arctic Water Pollution Protection Act will be extended from 100 to 200 nautical miles from Canada's coast (limit of Canada's Exclusive Economic Zone)
- In July 2010, legislation was passed requiring vessels sailing in the Canadian Arctic to report their passage through their territory.
- Icebreaking, pollution response, search and rescue initiatives: Canada is actively working on the development of a Polar Code to create enhanced shipping regulations in order to improve safety and environmental protection.

Canada's vision for the Arctic includes clearly defined boundaries, healthy, productive ecosystems, and flourishing indigenous peoples, said Mr. Hausseur. Arctic Council engagement is a priority in Canadian foreign policy. He noted all Arctic States have developed Arctic Strategies and congratulated Denmark on their recently published strategy.

Mr. Hausseur underscored Canada's position that the Arctic Council is the primary forum for Arctic governance, and that it should continue to be strengthened. The outcomes of the Nuuk Ministerial meeting in May 2011 show what can be done. He advocated that the Arctic Council should move from a policy-shaping forum to policy-making body. Collective responsibility and collective action are needed in the Arctic. He pointed out that Canada is hosting the first delegations to discuss joint search and rescue strategies in Arctic.

Regarding the Swedish Chairmanship of the Arctic Council, Mr. Hausseur said he looked forward to working with the Swedes and said he was pleased that human dimension issues were part of the Swedish programme. Canada will work to get the new Secretariat in Tromsø up and running while preparing for the 2013 – 2015 Canadian chairmanship. As for those who want to become observers on the Arctic Council, he said now that conditions for observer status have been agreed at the Nuuk Ministerial, the Arctic Council must now deal with current observer applicants.

Mr. Hausseur wrapped up his presentation by mentioning that Canada was the single largest contributor to the latest IPY research efforts, and that Canada is hosting the final IPY conference in Montreal in 2012, which will highlight the latest polar research and how it can be put to use.

## **DISCUSSION**

Zuzanna Bieniuk from the European Commission asked whether the new search and rescue agreement was opening new areas of cooperation or if it was simply a memorandum of understanding.

In response, Ambassador Anton Vasiliev said that internationally, there has been real cooperation. Canada has organised a meeting to find concrete ways for rescuers to work together. The new agreement signed in Nuuk will facilitate cooperation as well as save money, bring knowledge together and speed up operations.

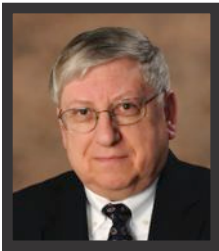
# PERSPECTIVES FROM ARCTIC COUNCIL NATIONS (PART 3)

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MODERATOR:

## LAWSON W. BRIGHAM

*DISTINGUISHED PROFESSOR OF GEOGRAPHY & ARCTIC POLICY, UNIVERSITY OF ALASKA FAIRBANKS*



Prof. Brigham opened the session by talking about observer status criteria for the Arctic Council. He asked questions for consideration: “What can an observer state provide to the Arctic Council?” and “What is the interest of an observer state?”

A mandatory polar code for navigation, set to be put in place by 2013, would be a big thing, he said, and the international community would put pressure on the Arctic States to apply it effectively.

## SOFFIA GUÐMUNDSDÓTTIR

*EXECUTIVE SECRETARY, PROTECTION OF THE ARCTIC MARINE ENVIRONMENT (PAME) WORKING GROUP OF THE ARCTIC COUNCIL*



### **PAME ROAD MAP 2011-2015 AND THE ARCTIC MARINE STRATEGIC PLAN**

Soffia Guðmundsdóttir gave a presentation describing PAME's activities. PAME is a working group that addresses policy and non-emergency pollution prevention and control measures related to the protection of the Arctic marine environment from land and sea-based activities through coordinated action programmes and guidelines.

The direction of PAME's work plan 2011-2013 and the Arctic Marine Strategic Plan has been provided by ministerial declarations, said Ms. Guðmundsdóttir.

The work plan's objectives are to:

- Improve knowledge and respond to emerging knowledge of the Arctic marine environment.
- Determine the adequacy of applicable international and regional commitments as well as promote their implementation and compliance.
- Facilitate partnerships.

She spoke about the Arctic Marine Shipping Assessment (AMSA), saying that it was circumpolar, yet it had a regional and local focus, and that it reaffirmed the application of the UN Law of the Sea.

A key finding of the Arctic Climate Impact Assessment (ACIA) was that reduced sea ice is very likely to increase marine transport and access to resources. The Arctic Marine Strategic Plan (AMSP) sought to conduct an assessment of Arctic marine shipping at current and projected levels. If one compares the September 1979 Arctic sea ice

minimum extent to the September 2011 minimum extent, it is clear the Arctic is opening up, and economic activities in the region will increase.

Next, she addressed AMSA recommendations and follow-up, which included:

- Enhancing Arctic Marine safety. This can be done by moving IMO Arctic guidelines from being voluntary to mandatory, encouraging the cruise ship industry to take part in developing self-preservation measures, and assessing risks of using heavy fuel oils in the Arctic. PAME is currently looking at how to follow up on this.
- Protecting Arctic peoples and the environment. This can be accomplished by conducting surveys of how Arctic indigenous peoples use the marine environment as well as identifying areas of heightened ecological and cultural significance and officially labelling them as “special areas”.
- Building Arctic marine infrastructure. Many improvements are needed.
- The Arctic Ocean Review (AOR) project. This is a multi-phase project, both global and regional. It will be based on information that is already available.
- Providing guidance to Arctic Council ministers so they can provide effective governance.

Ms. Guðmundsdóttir then discussed the ecosystem approach to management. Issues concerning the marine environment can be extremely complex due to ecosystems’ complexity and interconnectivity.

She highlighted a number of best practice solutions:

- Effective ecosystem-based management needs to be applied flexibly.
- Decision-making must be integrated and based on scientific findings.
- National commitment from Arctic Council member states is required for management to be effective.
- Participation of stakeholders and Arctic residents is key.
- Adaptive management is critical.

Ms. Guðmundsdóttir ended by saying that updating the 2004 Arctic Marine Strategic Plan will be done in two two-year phases: 2011-2013 and 2013-2015. Development will be based on scoping and outcomes from other Arctic Council work.

At the end of Ms. Guðmundsdóttir’s presentation, Prof. Brigham mentioned that there have been many people involved in PAME: 70 people over three years. They have had several town hall meetings to discuss their findings with local Arctic residents.



## TOM BARRY

*EXECUTIVE SECRETARY, CONSERVATION OF ARCTIC FAUNA AND FLORA (CAFF)  
WORKING GROUP OF THE ARCTIC COUNCIL*

### ARCTIC BIODIVERSITY TRENDS 2010 REPORT

Tom Barry introduced CAFF, highlighting that its thematic focus is biodiversity. The Arctic has a globally significant and huge array of biodiversity, with several million



reindeer and caribou living there, as well as 279 migratory bird species that travel there annually, including 80% of the global goose population.

Mr. Barry then turned to the challenges involved in monitoring biodiversity and proposed solutions:

- Create dynamic forward - looking approach to monitoring.
- Shorten response time by bringing information to where it is needed.
- Engage all relevant parties (industry, local inhabitants, etc.).
- Sustain funding to support monitoring programmes so that everyone knows what is going on and can answer questions.
- Help bridge the gap between the scientific community and policymakers and better inform policymaking.

Following this, Mr. Barry mentioned the different aspects of CAFF: monitoring, assessment, conservation of species and ecosystems, global issues affecting policy and international cooperation, and education and outreach. He also mentioned the 2010 Arctic Biodiversity Trends Report, and discussed how it helped to bridge the divide between the scientific and policymaking communities.

With unique habitats disappearing in the Arctic, Mr. Barry concluded with a few recommendations, including:

- Responding to key findings (i.e. establishing more marine protected areas).
- Taking steps to better understand what is happening in the Arctic and developing appropriate responses.
- Raising awareness about the importance of Arctic biodiversity and the challenges it faces at both local and global levels.

Prof. Brigham commented that the governing instrument is the UN Convention on the Law of the Sea, and it is very complex trying to balance protection of the ocean with freedom of navigation.



## LARS-OTTO REIERSEN

*EXECUTIVE SECRETARY, ARCTIC MONITORING AND ASSESSMENT PROGRAMME (AMAP)*

### RELEASE OF AMAP REPORT ON ARCTIC POLLUTION

At the start of his presentation, Lars-Otto Reiersen emphasized the broad scope AMAP covers. He listed issues facing the Arctic:

- Annual surface air temperature has been increasing. The Arctic is warming twice as fast as the rest of the world. The last five years have been the warmest years ever recorded, with the greatest warming in the North.
- Sea ice has been decreasing. Not only has its extent been decreasing, but also the age and thickness of the ice.

- Projections for permafrost thaw in 2050 and 2090 show significant changes in continuous and discontinuous areas of permafrost.
- The Greenland Ice Sheet is contributing more to sea level rise than previously thought.
- Sea level rise by 2100 is predicted to be 0.9 - 1.6 metres.

Mr. Reiersen said there are some positive and some negative feedbacks in the 2011 AMAP Arctic Change Assessment (ACA). For example, biological impacts include a predicted reduction of polar bear population by 2/3 by 2050, and new southerly species are encroaching on the Arctic.

Pollutants from central Europe from biomass burning in agriculture and forest fires create black carbon particles. These particles make their way to the Arctic, and amplify warming as they darken ice and snow and facilitate greater heat absorption. Mr. Reiersen then showed a graph of which nations black carbon in the Arctic comes from: Russia and the US generate a lot.

He then moved on to the topic of mercury pollution in the Arctic. A lot of it is coming from Asia due to increased coal burning (five times as much mercury comes from Asia as comes from Europe). Mercury levels are still increasing in the Arctic due to long-distance transport of pollutants.

Bioaccumulation of contaminants such as mercury has been monitored in the blubber and fat of Arctic animals, and people as well. Analysis of historical trends in mercury concentration in hard tissues of various Arctic biota shows that, on average, over 90% of the present-day mercury in Arctic wildlife is likely to be of anthropogenic origin (inputs of mercury from pollution sources).

Contaminants can have negative impacts on humans living in the Arctic. Mercury accumulation leads to babies being born with high blood pressure; an increase in diabetes in men has been linked to PCB contamination; indigenous adult males have seen an accumulation of PCBs, DDT, HCH and HCB in their tissues.

Mr. Reiersen then looked at the drivers and pressures outlined in the Arctic Change Assessment (ACA) and a conceptual model of the ACA process. The drivers include climate change, global pollution, local development, migration of animals and humans, demand for resources, recreation and tourism, and others.

The main purpose of ACA is to enable more informed timely, coordinated and responsive policy and decision-making in a rapidly changing Arctic.

In closing, Mr. Reiersen advocated more funding for research along with greater access to and sharing of data from the local to the national level.



## KNUT ESPEN SOLBERG

SENIOR RESEARCHER, DEPARTMENT FOR RESEARCH AND INNOVATION, DET NORSKE VERITAS

### THE IMPACT OF THE ARCTIC COUNCIL COOPERATION AGREEMENT ON AIR AND SEA SEARCH AND RESCUE (SAR) ON THE SAFETY OF SHIPPING

Offering the shipping industry's perspective on the recent Arctic Council Search and Rescue Agreement, Knut Espen Solberg opened his presentation by addressing the importance of communication in the Arctic. While the binding agreement is a step

forward, without communication, one can easily get lost, as the Arctic is so vast. There is little infrastructure. If a ship is in distress, it's still necessary to send a vessel after it, since rescue helicopters can only go so far from land without needing a ship nearby to use as a base of operations.

You need to have the resources there to carry out any rescue, said Mr. Solberg. Accidents do happen, and there is a potential for loss of life. Cargo ships pose a pollution risk. Cruise ships can be huge, carrying hundreds of passengers, while one helicopter can only carry 4-6 passengers. If you look at how much capabilities have advanced over the last 30 years, things haven't advanced that much.

Solberg then took a look at risk. He defined risk as a product: probability times consequences ( $r = p \times c$ ). However in the Arctic there are additional risks, and these risks are not being addressed in regulations, although they have been identified by AMAP (he cited freezing temperatures impeding operations as an example).

Mr. Solberg then listed specific issues that hindered proper search and rescue capabilities:

- Unreliable communication.
- Extreme cold.
- 24 hour darkness for a good part of the year.
- Vast area to cover.
- Sea ice preventing marine access.
- Long deployment time of rescue vessels and long distances to travel due to lack of ports.
- Lack of onshore reception facilities for medical treatment.
- Helicopter ranges very limited due to lack of heliports and refuelling stations.

Infrastructure investments for SAR take time to implement, but they are necessary said Solberg.

Regarding regulations, Mr. Solberg argued that it is easier and more cost-effective in the long run to implement them before the shipping industry starts to expand its operations in the Arctic, rather than to implement them ex post facto, as implementation would be more difficult, and you run the risk of a major accident happening. While putting regulations in place may be more expensive in the beginning, it costs less money over the long-term. The shipping industry has a responsibility for safety, as does the tourism industry.

In reference to the SAR agreement, Mr. Solberg asked where the money is to make such infrastructure investments. Russia is investing in its infrastructure to further its own interests, with the goal of making money. The US is also making major investments, but these investments will take years to be completed.

He addressed the possibility of pooling resources in the Arctic, but lamented there aren't many resources available in the region. To emphasize his point, he gave the example of Canada and Russia, which have aging icebreaker fleets, and Greenland, which has one helicopter with a winch. This is hardly adequate infrastructure for search and rescue. Yet the shipping and tourism industries will carry on regardless of whether there is infrastructure or adequate regulation, as long as there's money to be made.

He brought up the point that the media's interpretation of what is happening in the Arctic is often not accurate, and does not reflect the views of those who live and work in the region. The media either say that there is a race for resources in the Arctic with unstable and ad hoc governance, or there is a stable and rules-based Arctic saga unfolding, or the Arctic is seen as a nature reserve to be protected at all costs.

In conclusion, Mr. Solberg brought attention to the fact that it usually takes major disasters for any major advances to take place. For example, SOLAS was developed after the Titanic sank, and full double hulls on oil tankers were only required after the Exxon Valdez oil spill in Alaska. It is only a matter of luck that no major incidents have happened in the Arctic since then.

## DISCUSSION

The first question from the audience was addressed to Tom Barry about whether fisheries trends were part of CAFF's mandate.

Mr. Barry responded that CAFF does not focus on commercial fisheries. Arctic Council Working groups have a limited mandate. CAFF's mandate is only to address the conservation of Arctic biodiversity.

CAFF therefore selects species to monitor based on biodiversity criteria. In some cases, this includes species that are fished.

Mr. Barry said that non-Arctic scientists are most welcome to participate in the research of the Arctic Council working groups. There is already cooperation with scientists from non-Arctic Council nations.

Prof. Konrad Steffen from the University of Colorado at Boulder asked about who sets priorities in choosing the subjects and projects the Arctic Council working groups look at. Are they based on scientific findings? Or are they based on what politicians think is important to study?

IPF Vice-President Nighat Amin thanked Knut Espen Solberg for providing a reality check on the situation with shipping and search and rescue infrastructure in the Arctic, and commented that the cost of building icebreakers is high. She wanted to know what the real figures were for building ships capable of navigating Arctic waters.

In response to Ms. Amin's question, Prof. Brigham and Mr. Solberg mentioned that vessels use charts and maps for navigation, and that most people operating in the Arctic are doing it safely, although there is no harmonised regulation. It is expected in the future that conventional vessels will go north. There are no additional requirements as far as equipment and training are concerned. Stretching the summer shipping season leads to risks. However the risks are not the same in the Arctic as they are elsewhere on the planet.

Mr. Barry then responded to Prof. Steffen's question, discussing what the Arctic Council is doing in the context of sustainable development (Rio +20). The main aim of the CAFF assessment is to provide information for policy making in this field.

Ms. Guðmundsdóttir added that PAME has developed offshore operational guidelines. Each country has its own regulation concerning environmental impact assessment, yet countries cooperate through the implementation of the ESPOO convention.

Prof. Brigham ended the session pointing out that the Arctic Council is making progress. He mentioned the meeting in Oslo on Oil Spill Response taking place the following week (17-21 October) as an example that things are moving forward. The Nuuk agreement was a first step, and there is a need to look at different worst-case scenarios. There are currently little means to respond to disasters in the Arctic. Cruise ships run the largest risk. Being prepared for an oil spill should be a top priority.

# THURSDAY 13 OCTOBER 2011

*The second day of the Arctic Futures Symposium 2011 focused primarily on scientific contributions towards better understanding the Arctic, its environment, and how it is changing. Topics from sea ice to the Greenland Ice Sheet, from permafrost to paleoclimate research, and from Arctic research projects to the benefits of Earth observation capabilities were discussed.*

*The final session of the day focused on natural resource exploitation in the Arctic. Due to a last-minute change in scheduling, a member of the Sámi Council participated in the round table discussion, allowing for a different perspective to make its way into the discussion.*

## SCIENCE AND COOPERATION IN THE ARCTIC

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MODERATOR:

**OLAV ORHEIM**

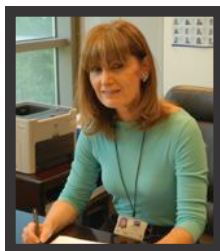
GLACIOLOGIST, CLIMATOLOGIST AND POLAR EXPERT, THE RESEARCH COUNCIL OF NORWAY



Dr. Orheim opened the first session of the day noting the large amount of scientific research going on in the Arctic as well as the large number of research stations in the region.

**MANUELA SOARES**

DIRECTOR OF THE ENVIRONMENT PROGRAMME, DG RESEARCH AND INNOVATION, EUROPEAN COMMISSION



**THE 7TH FRAMEWORK PROGRAMME AND ITS ROLE IN PROMOTING  
COLLABORATIVE RESEARCH IN ARCTIC SCIENCE: LOOKING AHEAD AND BEYOND**

The previous day saw Commissioner Damanaki explain how the Commission is dealing with increased human activity in the Arctic. Ms. Soares said she would outline the EU Commission's policy goals in the Arctic:



- 1 To contribute to the preservation of the Arctic in unison with its peoples through a better understanding of its natural and human environment.
- 2 To ensure that industrialisation and natural resource exploitation are carried out in a sustainable way.
- 3 To contribute to enhanced Arctic governance by ensuring that the EU's actions are aligned with what other players in the region are doing.

The EU Commission's 7<sup>th</sup> Framework Programme is part of the first goal, as research plays a key role in helping to protect and preserve the Arctic.

A key part of the global climate system, the Arctic is warming twice as fast as the rest of the world. Sea ice coverage neared record lows during the summer of 2011, and the ice is thinning faster than anticipated by climate models. Increasing temperatures will contribute to feedback cycles, which in turn will lead to more warming.

Ms. Soares highlighted the importance of balancing the economic opportunities a more accessible Arctic offers and environmental protection.

Successive EU Framework Programmes over the last decade have set aside a significant budget for Arctic Research – over €200 million. These funds have supported research projects on questions of vital importance to the Arctic environment and its populations.

She gave a few examples of research areas EU-funded projects are looking at:

- The natural environment.
- The effects of climate change on human health.
- The socio-economics of climate change.
- Support for research infrastructures.

A few specific projects she mentioned include:

- The PAGE 21 project [www.page21.eu](http://www.page21.eu), launched in November 2011, which looks at the process and dynamics of permafrost.
- The Ice2Sea project [www.ice2sea.eu](http://www.ice2sea.eu), which aims to get better estimates of how melting land ice (ice sheets, glaciers) will contribute to sea level rise. The project has shown that the most important factor concerning melting ice sheets is not the air above them, but the warmer oceans into which they flow.
- The RECONCILE project, which is monitoring developments in the stratospheric ozone layer (the project discovered recent ozone depletion over the Arctic).
- The ArcRisk project [www.arcrisk.eu](http://www.arcrisk.eu), which is looking at the linkages between environmental contaminants, climate change and human health, explores how climate change may affect human reproductive health in the Arctic.
- Research projects looking at socio-economic impacts of climate change, such as ACCESS [www.access-eu.org](http://www.access-eu.org), HERMIONE [www.eu-hermione.net](http://www.eu-hermione.net) and ATP [www.eu-atp.org](http://www.eu-atp.org)

FP7 has also helped to develop infrastructure for research in the Arctic: EMSO [www.emso-eu.org](http://www.emso-eu.org), ESONET [www.esonet-noe.org](http://www.esonet-noe.org) and EuroSITES [www.eurosites.info](http://www.eurosites.info) have created networks for monitoring the sea floor and deep ocean; SIOS [www.sios-](http://www.sios-)

[svalbard.org](http://svalbard.org) and INTERACT [www.eu-interact.org](http://www.eu-interact.org) have developed research networks on land in Svalbard and beyond.

Ms. Soares pointed out that there is a time lag between investment and having results from the research conducted. The results from 6<sup>th</sup> Framework Programme projects such as DAMOCLES [www.damocles-eu.org](http://www.damocles-eu.org), which looked at impacts of changing sea ice on the environment and human activities, will only start to come out in 2012. DAMOCLES continues to produce results despite the fact it ended in 2010. The project established strong links with American SEARCH [www.arcus.org/search](http://www.arcus.org/search) programme.

As FP7 draws to a close in 2013, the EU Commission will have a look back at the programmes it has funded, and lessons learned will be used in devising future programmes. The Commission is working on the successor of FP7 for the next framework for the period 2014-2020, Horizon 2020. This research programme will consolidate all existing EU instruments for Research and Innovation under a single framework.

It is expected that the EU Parliament and Council will approve Horizon 2020 by the end of 2011. The budget is expected to be €80 Billion, with details of how this money will be split to be decided later.

Horizon 2020 will be structured around three areas:

- 1 Boosting scientific excellence by strengthening the European Science Council and stepping up research infrastructures as well as training and mobility of scientists in Europe.
- 2 Tackling societal changes by supporting activities from research and development to market, focusing on challenges such as climate change, resource scarcity, changing demographics, and food and water security.
- 3 Creating industrial leadership and a competitive framework to support business research and innovation.

Horizon2020 will also offer opportunities for collaborative research, supporting a wide range of activities spread across different domains as well as critical European research infrastructures. It is also hoped the focus on innovation will promote economic prosperity in the region.

She concluded by stating research and innovation are “key for developing appropriate responses to Arctic challenges,” and that the Arctic will continue to feature strongly on the EU’s research agenda.



## JEAN-CLAUDE GASCARD

*EMERITUS RESEARCH DIRECTOR CNRS/ UNIVERSITÉ PIERRE ET MARIE CURIE, PARIS, FRANCE, COORDINATOR OF THE DAMOCLES (FP6) AND ACCESS (FP7) EU PROJECTS*

### ARCTIC CLIMATE CHANGE AND ITS IMPACT ON ECONOMY AND SOCIETY

Prof. Gascard introduced the new European project he is leading, called ACCESS (Arctic Climate Change Economy and Society). It is a four-year programme which began in March 2011 and is receiving its funding under FP7. It is a consortium of partners from France, Germany, the UK, Norway, Sweden, Finland, Denmark, Spain, Ireland, and Russia.

ACCESS has five working groups:

- A first group will focus on monitoring and modelling Arctic climate change involving the ocean, the atmosphere and sea ice.
- A second group will study the opening of the northern passages to marine transport, north of Europe and Siberia (North-East passage) and through the Canadian Archipelago (North-West passage) as well as the impact of these transportation activities on marine ecosystems and society.
- A third group will examine how climate change impacts Arctic fisheries, aquaculture and livelihood, mainly in the sub-Arctic sectors such as the Barents Sea.
- A fourth group will determine how the extraction of offshore oil and gas might be influenced and affected by climatic change, taking into account associated risks.
- A fifth group will examine Arctic governance options emerging from the findings of the other groups.

Prof. Gascard described the issues that are addressed in the different work packages (WP) of the project.

#### **WP1: Climate Change and the Arctic Environment**

ACCESS is looking at changes in sea ice extent and how to better predict these changes. Prof. Gascard briefly discussed new technologies being used to take measurements, such as ice-tethered TCD (temperature, conductivity and depth) profilers and expeditions like TARA, a ship which drifted in the Arctic pack ice over two years taking measurements of the atmosphere, the sea ice and the ocean.

Prof. Gascard went into detail about what has been happening to Arctic sea ice. The average extent has been decreasing, the ice has been moving faster, and it is becoming younger and thinner due to increased summer sea ice melt.

Based on maps and illustrations, he showed that the number of freezing days has been decreasing, with the duration, strength and area of cold decreasing overall.

He then discussed vertical profiles of temperature and salinity in the Canadian basin and in the Eurasian basin. He explained that in the summer, the ocean acts like a sponge and absorbs solar radiation. As a result, ocean temperature increases. However the oceans are not yet reacting dramatically to sea ice loss, as it takes a while for the oceans to absorb heat (water has a high specific heat).

Prof. Gascard then focused on September minimum sea ice extent in the Arctic, considering both observations and model runs. He highlighted a curve in his presentation showing how September minimum sea ice extent has gone from 6 million km<sup>2</sup> to just over 4 million km<sup>2</sup> since regular satellite observations began in 1979.

As far as predicting changes in sea ice, he said the models used in the IPCC's 4<sup>th</sup> Assessment Report [www.ipcc.ch](http://www.ipcc.ch) released in 2007 have not been able to reproduce sea ice changes in the Arctic very accurately, and that more variables and parameters needed to be factored into the models.

The peak minimum sea ice extent at the end of the summer melting season has been shifting by almost one month. A shift in sea ice break-up in the spring has also been observed, as well as a delay in ice freeze-up in winter. One of the things ACCESS is trying to predict is when the sea ice break-up starts and how this process might unfold 30 years from now. Looking at sea ice at different latitudes – particularly from 80°N to the North Pole – it can be seen that the minimum sea ice extent in 2007 was very low.

**WP2: Marine Transport and Tourism**

This working group is looking at how climate change will be affecting activities such as shipping and tourism as the Northern Sea Route and Northwest Passage open up, as well as the impact this will have on marine ecosystems and society. It also looks at pollution due to increased activities and its impacts, including the effects of black carbon as a climate forcing mechanism.

**WP3: Fisheries**

This working package is looking at climate change impacts on Arctic fisheries, aquaculture and livelihood of those who depend on living resources.

Prof. Gascard discussed the sensitivities of coastal fisheries to climate change. He mentioned an ACCESS project partner, the Centre for Climate and Environmental Change (CICERO), has been looking at cod landings in Finnmark in northern Norway. Research has shown a high correlation between cod landings and ocean temperature. The long-term question will be whether their data will be reliable enough for the European Commission to use in developing fishing quotas.

**WP4: Resource Extraction**

Work package 4 looks at how resource extraction might be affected by climate change. Opportunities as well as risks of offshore oil and gas extraction are being analysed. Issues being investigated include oil spill response in ice-covered waters and how the number of icebergs might increase as calving from outlet glaciers on the Greenland Ice Sheet and elsewhere increases. Potential environmental hazards are also being investigated.

**WP5: Governance, Sustainable Development and Synthesis**

The last work package looks at Arctic governance options based on the findings of other work packages. It looks at how marine spatial planning and ecosystem-based management can contribute to governance schemes.

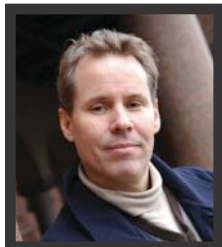
This work package will analyze climate indices and see if there is a relationship with socio-economic indicators.

An open forum involving the indigenous peoples of the Arctic, other Arctic stakeholders and end-users has been established for the project to give an opportunity to all stakeholders to interact with ACCESS partners.

In addition to the five main work packages, Prof. Gascard mentioned that there are also work packages for dissemination, management and scientific coordination within the programme.

Prof. Gascard concluded by asking everyone to visit the ACCESS website [www.access-eu.org](http://www.access-eu.org) where they can find all information about ACCESS and a regular newsletter.

Dr. Orheim commented that observations of changes in sea ice and sea ice temperatures are being done, and we will soon be able to have better models of sea ice change.



## MARTIN JAKOBSSON

*PROFESSOR OF MARINE GEOLOGY AND GEOPHYSICS, DEPARTMENT OF GEOLOGICAL SCIENCES, STOCKHOLM UNIVERSITY*

### HOW STUDYING ARCTIC PALEOCLIMATES CAN PROVIDE INSIGHT INTO WHAT TO EXPECT IN A WARMING ARCTIC

Prof. Jakobsson's presentation focused on the study of past climate in the Arctic based on climate archives such as ocean and lake sediments, ice cores, tree rings and landforms as well as numerical modelling. His research involves investigating sediment cores from the Arctic Ocean (so far only one has been extracted in 2004, but more are planned) and oceanographic research (such as mapping the seafloor to look for clues of past geologic events).

Scientists have a rough idea of how the Earth's climate has changed over time. Prof. Jakobsson showed a graph from Zachos et al. detailing a global temperature curve over the past 65 million years derived from deep-sea benthic foraminiferal oxygen-isotope data.

Higher resolution timescales are available for the last 2,000 years, however. In the higher resolution timescale, there is clear evidence of unprecedented warming over the past century or so; however this warming must be put into perspective by looking at longer-term changes going back further in time.

Geological deformations are also used in studying paleoclimate. For example, scars on the sea floor carved by ancient ice sheets and ice streams can indicate the limit of their extent in past times.

Martin Jakobsson then moved to the topic of Arctic Ocean sea ice observations.

#### 1 Sea Ice Cover in the Arctic Ocean

A record low sea ice extent was measured in 2007. Sea ice cover was almost as low in 2011. It is a very variable and dynamic system.

Prof. Jakobsson mentioned a study by Prof. Ola Johannessen<sup>1</sup>, which shows a correlation between declining sea ice and a rise in atmospheric CO<sub>2</sub> concentrations.

He then offered some questions he and other Arctic paleoclimate researchers are considering:

- Since when has the Arctic Ocean been covered with sea ice?
- Were there previously ice-free summers in the Arctic Ocean?
- What were the implications of ice free summers?
- What were the past links between sea ice and atmospheric CO<sub>2</sub> concentrations?

Prof. Jakobsson then explained the research that has been done so far to answer these questions:

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<sup>1</sup> Johannessen 2008, "Decreasing Arctic Sea Ice Mirrors Increasing CO<sub>2</sub> on Decadal Time Scale."  
<https://bora.uib.no/bitstream/1956/2840/1/200806005.pdf>



There are a number of people working on paleo sea ice cover, some on longer timescales than others. For shorter timescales, it's possible to have higher resolution, meaning one has a better idea of what was happening in the past on a decadal or even on an annual timescale. He offered a synthesis of different studies looking at different timescales.

In 2004, a team of researchers under the Arctic Coring Expedition (ACEX), which was led by Jan Backman (U. Stockholm) and Kate Moran (U. Rhode Island), drilled a 428-metre sediment core in the central Arctic Ocean. Numerous studies have been done on this sediment core, looking at geochemical markers (diatoms, cyanobacteria, carbon dating). From these studies, it was determined that seasonal sea ice began to form sometime around 47.5 million years ago, and 47 million years ago offshore sea ice began to form. Prior to this, the Earth was warmer, and so was the ocean.

The last sea ice minimum in the Arctic occurred 8,500-6,000 years ago during the Holocene Thermal Maximum (this was due to the Earth's orbital cycles – the Earth was closest to the sun during the boreal summer – see Funder et. al paper in *Science*<sup>2</sup>).

Researchers can also learn from observed beach ridge complexes that were formed by wave action. If there are no beach ridge complexes, it means that sea ice went up to the shore. There was a clear trend 6,000 – 8,000 years ago. At this time, there was seasonal sea ice cover in winter, but the summer was more or less ice-free. About 3,000 years ago, the climate entered a much colder period.

Prof. Jakobsson then explained that modelling past Arctic sea ice cover based on what we know can help us to predict how sea ice might behave as the planet warms. The Mid-Holocene some 6,000 years ago is a good test period for climate model behaviour during warm conditions. None of the sea ice model simulations show summer sea ice disappearing completely. This could be an indication that as the Arctic warms, all of the sea ice may not disappear in summer (Jakobsson showed Johannessen's graph relating sea ice cover and CO<sub>2</sub>).

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2 Fudner et. al 2011, "A 10,000-Year Record of Arctic Ocean Sea-Ice Variability—View from the Beach." <http://www.sciencemag.org/content/333/6043/747.abstract>

## 2 Land ice cover

The Ellesmere Island ice shelves in northern Canada are disappearing after having been stable for more than 5,000 years. “Can paleorecords help to provide information on what to expect in the Arctic as it warms?” asked Prof. Jakobsson.

Looking at the Pine Island Glacier in West Antarctica can be a good reference for what to expect, as its flow has been rapidly accelerating in recent years.

During fieldwork in the Antarctic, a survey of the sea floor was undertaken and sediment cores were extracted. Researchers were able to determine how far out the glacier extended. They were able to see furrows created by icebergs (glacial lineations) which indicate a huge ice shelf breakup.

## 3 Vulnerable Permafrost Carbon Pools

A collaborative project between Sweden, Russia and the US called SWERUS-C3 (C3 stands for Climate Cryosphere Carbon Interactions) is getting underway in 2012 to look at how permafrost in coastal regions and under the sea might release carbon, he said.

A two-leg international cruise expedition with an icebreaker is scheduled to do the first survey in the Arctic Ocean in 2014.

Prof. Jakobsson concluded by saying that the Arctic Ocean is an arena for international collaboration, and mentioned a few organisations which illustrate this:

IOC – International Oceanographic Commission.

IASC – International Arctic Science Committee.

APEX – Arctic Paleoclimate and its Extremes project.

## DISCUSSION

IPF Vice-President Nighat Amin asked Prof. Jakobsson who generally funds the kind of research he plans to do in the Arctic.

Wendy Watson-Wright from the International Oceanographic Commission in UNESCO commented that the IOC is happy to support the kind of work Prof. Jakobsson and his colleagues are doing. She said the research also fits very well within the mandate of UNESCO.

Dr. Orheim asked if we are approaching a tipping point where the Earth’s climate might drastically change.

Prof. Gascard responded that shifting from one climate regime to another takes place over very long periods of time. Looking at time periods of decades to centuries is more relevant. The current changes in sea ice will be there for some time, said Gascard. The natural system of the Earth has the capacity to absorb short-term changes, which is not so relevant on long geological timescales. Gascard added that accidental events such as volcanic eruptions and meteorite impacts can have a significant short-term effect on climate.

Prof. Jakobsson addressed Dr. Orheim’s question as well, saying that we are approaching a tipping point if we look at the human dimension. It is possible to move extremely fast in and out of regimes. We had higher solar insolation during the Holocene Thermal Maximum; now it appears that changes are being brought about by anthropogenic greenhouse gas emissions.

Prof. Peter Schlosser from Columbia University added that if you compare sea ice observations and models, it is remarkable how closely models made in the 1980s

predicted what we are seeing now. He also said sea ice decrease, and we will eventually end up with sea ice free summers. This decline will not be a smooth curve, he said.

Prof. Jakobsson argued that models don't always have the real sea ice dynamics in them. One should always compare paleoclimate records to models. There needs to be more dialogue between process scientists and modellers to resolve this issue.

Dr. Orheim commented that models take into account the movement of sea ice.

Prof. Konrad Steffen from the University of Colorado commented models used to be vertical models, but the ice is moving faster now, so models must have a spatial component to them.

Eric Turner from AECOM asked if there is a rush to get information from ice cores before the ice sheets melt.

Dr. Orheim responded that the ice in the central part of the ice sheets, where ice cores are extracted, are fine. Ice is only rapidly diminishing around the edges of the ice sheets.

Scott Stevenson, a student from the University of California Los Angeles (UCLA), asked if ACCESS will cover social and economic aspects, if it will be entirely marine, and if it will also cover the atmosphere and ice as well.

Prof. Gascard responded that ACCESS will cover social and economic aspects and it will bring in the expertise of climate experts, oil and gas companies, and fisheries. However the main focus is on the marine component in the Arctic.

Manuela Soares added that ACCESS is an excellent example of multidisciplinary research project.

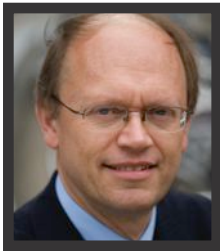
# PREDICTING CLIMATE IMPACTS ON THE ARCTIC

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MODERATOR:

## JEAN-PASCAL VAN YPERSELE

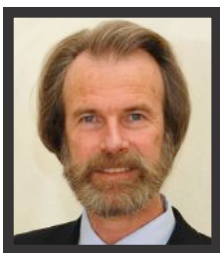
*PROFESSOR OF CLIMATOLOGY AND ENVIRONMENTAL SCIENCES, UNIVERSITÉ CATHOLIQUE DE LOUVAIN; VICE-PRESIDENT, INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE*



Prof. van Ypersele started the session with a comment about how it is important to understand all aspects of climate, and how international collaboration is key. He cited the example of the 1987 Montreal Protocol as a good example of how international collaboration can help put an end to activities that were damaging the Earth's ozone layer.

## KONRAD STEFFEN

*DIRECTOR, COOPERATIVE INSTITUTE FOR RESEARCH IN ENVIRONMENTAL SCIENCES (CIRES), UNIVERSITY OF COLORADO; CHAIRMAN, WORLD CLIMATE RESEARCH PROGRAMME, CLIMATE AND CRYOSPHERE PROJECT*



### EXAMINING GREENLAND ICE SHEET MECHANICS AND REVISITING ESTIMATES OF FUTURE SEA LEVEL RISE

Prof. Konrad Steffen introduced his topic, looking at the knowledge of ice sheet mechanics and revisiting estimates of sea level rise.

The Greenland Ice Sheet is almost 2,400 km long from north to south, and 1,100 kilometres across at its widest point. In certain places, the ice sheet is more than 3.5 km thick; if all this ice were to melt, it would raise sea levels by about 6 metres. About 10% of the Earth's freshwater ice is stored in the Greenland Ice Sheet.

Discussing the ice sheet's mass balance, Prof. Steffen said that overall, the ice sheet is not in balance. Ice discharge has increased dramatically over the past 10 years. He said that the it is losing about 280 Gt of ice every year, about half due to accelerated ice melting and half due to accelerating runoff glaciers. To give an idea of how much ice this is, he said there is about 80 Gt of ice in all the glaciers in the Alps.

The last IPCC Assessment Report, published in 2007, indicated that about 70% of the contribution to cryospheric sea level rise (sea level rise due to melting continental ice) is estimated to be coming from melting glaciers (small glaciers and ice caps), 20% due to melting of the Greenland Ice Sheet and 10% due to the melting of the Antarctic Ice Sheet. Total annual cryospheric sea level rise was estimated to be 1.28 mm/yr.

More recent analysis done in 2010 based on NASA's GRACE satellite data indicates that annual cryospheric sea level rise is 2.2 mm/yr. Half the contribution to cryospheric sea level rise is estimated to be due to melting glaciers, 30% due to the melting of the Greenland Ice Sheet and 20% due to melting of the Antarctic Ice Sheet.

In addition to the cryospheric component of sea level rise, there is an ocean thermal expansion component: as the ocean gets warmer, it expands in volume. About a third

of the total sea level rise comes from thermal expansion of the ocean. Overall, the rate of global mean sea level rise since 1993 is 3.3 mm/year.

It is predicted that there may be about 1 metre of global mean sea level rise or even more by 2100, according to recent research. There are, however, still significant uncertainties in sea level rise projections.

Prof. Steffen illustrated the potential impacts of sea level rise by showing a map indicating which coastal areas in Europe might be lost to the ocean if such sea level rise were to occur. He added that low-lying coastal areas such as Bangladesh will be very much affected by such a rise in sea level.

If one compares 2010 temperature measurements in Greenland to measurements of the last 50 years, Greenland is around 4.5°C above the long term average. The first decade of the 21<sup>st</sup> century has been much warmer than any of the previous centuries on record.

Prof. Steffen then discussed measurements being taken on the Greenland Ice Sheet at a number of different stations under Greenland Climate Network (GC-Net).

At Swiss Camp in the centre of the ice sheet, where Prof. Steffen has done most of his measurements over the last three decades, important net surface balance interannual variability has been observed. Warm and extended air temperatures are to blame for 5.2 m water equivalent surface lowering at the long-term equilibrium line altitude (ELA)<sup>3</sup> between 2000 and 2010. As a result of dramatic ice loss, structures at Swiss camp collapsed and had to be rebuilt.

The average air temperatures at another camp, the ETH/CU Camp, saw an average 2°C temperature increase per decade from 1991 to 2010.

The albedo of the surface of the ice sheet has also been affected. If one looks at variations from 1991 – 2009, one can see a notable reduction in surface albedo (normally about 80% of the solar radiation that hits the surface of the ice sheet is reflected). Ice that has melted and refrozen has a lower albedo than an unmelted surface covered in snow. As a result of this lower albedo, energy is being kept in the ice, helping to warm it up. Prof. Steffen showed a map illustrating surface albedo comparisons over time to make his point.

Prof. Steffen illustrated how well Greenland is being monitored. Passive microwave satellite mapping of Greenland takes place every day. The 30-year record shows a strong variability in Greenland total melt area due to the Arctic Oscillation. A strong increase has also been observed: total Greenland Ice Sheet melt area increased 65% since 1979 over the 30 year record; on average 2%/year. There is an increasing melting trend around the edges of the ice sheet. Satellites such as NASA's ICESat measure coastal regions and can track the decrease in the height of the ice. This is not due to surface melting, but rather to ice flowing more rapidly. The ice entering fjords around the edge of Greenland and the ice tongues flowing from the outlet glaciers are melted more quickly by a warming sea.

He mentioned the ice sheet was losing on average 50 Gt of ice per year prior to 2005. In 2005, it was losing 100 Gt of ice per year. Since then, this rate has increased to reach an average of 280 Gt per year over the past few years. This corresponds to about 0.8 mm/yr of sea level rise just from the Greenland Ice Sheet. Ice loss from the ice sheet exceeded 360 Gt in 2010.

During the summer melt season, the ice flow velocity accelerates anywhere between 50 and 100%. During the summer, the ice can move between 30 and 80 cm per day.

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3 Equilibrium line: The boundary between the region on a glacier where there is a net annual loss of ice mass (ablation area) and that where there is a net annual gain (accumulation area). The altitude of this boundary is referred to as equilibrium line altitude.

This explains part of the ice loss but not all of it, Prof. Steffen said. A lot of ablations on ice sheet surface fill with water. This water can travel via moulins (deep shafts, nearly vertical and roughly circular, formed when surface meltwater enlarges a crack in the ice) down through the ice sheet to the base and lubricate it, which can accelerate ice flow.

Prof. Steffen finished his presentation with an animation illustrating how the water lubricates the base of the ice sheet and makes it move more quickly into outlet glaciers and ice tongues. He also showed a film of him and his research team of graduate students going down into a vast moulin to place laser instruments that measure its volume and geometry. The instrument can show the huge volume of a moulin along with the water conduits that feed into it from elsewhere on the ice sheet.

He reminded everyone that ice dynamics are equally as important as ice melt, with each contributing about 50% to increased ice loss from the Greenland Ice Sheet. The phenomenon of cryohydrologic warming plays an important role: as ice warms, it has different properties, allowing it to flow faster towards the coast. Even though it may still be frozen, as a general rule, the warmer ice is, the more quickly it flows.



## SEBASTIAN GERLAND

*SEA ICE RESEARCH SCIENTIST, NORWEGIAN POLAR INSTITUTE, TROMSØ*

### CHANGE OF ARCTIC SEA ICE AND RELATED CONSEQUENCES

Dr. Gerland began by giving a few facts and figures about Arctic sea ice. He compared the sea ice and the ocean underneath to a Harry Potter book: the first page of the book is the sea ice, while the rest of the book is the ocean underneath. Arctic sea ice thickness can vary considerably, from a few cm to several metres thick. First-year ice is very thin, and older, multi-year ice is very thick. Winter sea ice extent is about three times as large as summer sea ice extent.

He then explained why sea ice is important:

- It plays an important role in the global climate.
- It regulates marine ecosystems and the Arctic food web – from sea ice algae to polar bears.
- Shipping routes are changing as the ice melts. The Northern Sea Route and Northwest Passage provide a new shortcut for shipping; however if you can go straight across the middle of the Arctic Ocean, it's much shorter.
- Melting sea ice is opening up new areas to natural resource exploration.
- The extent of the sea ice affects the habitats of animals tourists come to see.
- Sea ice is key for many Indigenous Arctic peoples, who live, hunt and fish on the ice.

There is a lot of large-scale Arctic sea ice monitoring and research taking place. He mentioned AMAP's SWIPA report [www.amap.no](http://www.amap.no) and the research being conducted under the ACCESS project. Data from the Cryosat-2 satellite launched in 2010 has been able to provide large-scale pictures of the sea ice. There are also a number of campaigns to take in-situ surface measurements of the sea ice.

Looking at Svalbard, Dr. Gerland contrasted two photos of Fjortende Julibreen at Krossfjorden – one taken by Prince Albert I of Monaco in 1907 and the other in May 2006. It showed the dramatic loss in ice over the course of the last century.



In Kongsfjorden, Svalbard, fast ice monitoring is ongoing. Ice thickness and extent in the fjord and other fjords is being measured. Researchers are also looking at the effects on the ecosystem both in and around the fjords.

Moving from local to regional sea ice observations, Dr. Gerland spoke of observations in the Barents Sea between 1979 and 2010. Mean monthly sea ice extent has seen a large interannual variability, yet there is a clear decreasing trend.

Information on the age of the ice that is drifting around in the Arctic shows that there is a clear trend towards thinner and younger ice. This younger ice has different properties, which has impacts on ecosystems.

In the past 10 years, ice thickness has been looked at more closely. Pointing out one area in particular in the Barents Sea, Dr. Gerland said there is a lot of interannual variability, but the overall trend is thinner ice. He added that new submarine data from beneath the ice will increase our understanding of ice thickness.

Addressing the topic of future scenarios in the Arctic, Dr. Gerland mentioned that Global Climate Models suggest an ice-free Arctic Ocean in the summer as early as 2037<sup>4</sup> or by 2100<sup>5</sup>. However, a recent study suggests that if sea ice does eventually completely disappear in summer, it could recover within two years from an ice-free situation, meaning that tipping point behaviours regarding sea ice at least seem unlikely<sup>6</sup> – although this doesn't consider the impact on and influence of organisms living in the Arctic.

Drifting with Arctic sea ice has been a good way of monitoring it. Dr. Gerland cited examples such as Roald Amundsen's ship the Fram in the late 19th century, drift stations the Russians have run since the 1930s and the IPY [www.ipy.org](http://www.ipy.org) Tara project.

He then went on to the role of snow, melt ponds and leads. He described how the DAMOCLES project [www.damocles-eu.org](http://www.damocles-eu.org) revealed how changes in snow surface affect albedo. Snow plays an important role, as it not only reflects solar radiation, but also insulates sea ice, which influences ice freezing rates. He said more snow research needs to be done. Cryosat-2 is taking data (data is available on the ESA website, [www.esa.int/SPECIALS/Cryosat/](http://www.esa.int/SPECIALS/Cryosat/)) and there are autonomous sensors deployed on the ice.

He mentioned IPF President Alain Hubert contributed to providing data on snow thickness during his 2007 Arctic Arc expedition across the Arctic from Siberia to Greenland. This ground-based information is important for calibrating data taken by Cryosat-2.

In his conclusion, Dr. Gerland reiterated that sea ice extent is declining on a long-term scale and different methods also reveal negative trends in Arctic sea ice thickness development over the past decades. The Arctic sea ice changes have substantial consequences for the climate, for the ecosystem and for society. He explained climate models show trends in the same direction as observations and indicated that feedback processes and the role of snow, melt ponds and leads are important for the further development of Arctic sea ice.

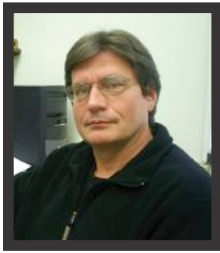
He ended by saying that for future studies, continuation of long-term time series, further development of measurement methods, remote sensing and models, and international collaboration are crucial for an improved understanding of the climatic processes and sea ice development.

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4 Wang and Overland 2009

5 Boé et al. 2009

6 Tietsche et al. 2011



## VLADIMIR ROMANOVSKY

*PROFESSOR OF GEOPHYSICS AT THE PERMAFROST LABORATORY AT THE  
GEOPHYSICAL INSTITUTE OF THE UNIVERSITY OF ALASKA, FAIRBANKS*

### TRENDS IN PERMAFROST DECLINE IN THE NORTHERN HEMISPHERE AND THEIR EFFECTS ON INFRASTRUCTURE

Prof. Romanovsky began by explaining what characteristics permafrost has and how it behaves. He showed a map of the areas of continuous and discontinuous permafrost in the Northern Hemisphere. The average depth of permafrost is 10 to 20 metres below surface, and temperatures can be as low as  $-15^{\circ}\text{C}$ .

He explained how permafrost is an inertial system, and that change in this system takes a very long time. Yet research shows that permafrost temperatures are changing very fast. His laboratory at the University of Alaska in Fairbanks keeps temperature records of permafrost. They drill boreholes and set up sensors in these boreholes to monitor changes in temperature.

He explained that there is a global network for monitoring permafrost. The IPY Thermal State of Permafrost (TSP) project helped to double the number of sites where permafrost is being monitored all over the Arctic and sub-Arctic in places like Scandinavia, Siberia, Alaska, Canada and even in the Antarctic to have a perspective of what's happening in the Southern Hemisphere. The TSP project provided a snapshot of what's happening with permafrost over a wide part of the globe.

Some findings from the international network of permafrost specialists indicate that the discontinuous permafrost zone is now very close to the threshold of thawing (between  $-2^{\circ}\text{C}$  and  $0^{\circ}\text{C}$ ). There are also areas of thawing permafrost within the continuous permafrost zone. Prof. Romanovsky highlighted areas of concern on a map.

Looking at time series he and colleagues have collected in Alaska and Siberia, Prof. Romanovsky said average permafrost temperatures have increased by almost  $2.5^{\circ}\text{C}$  since 1976. However in both Alaska and Siberia, these trends do not show a continuous warming, but rather some variability, probably due to interdecadal climate variability. Nonetheless, the data show an overall new wave of warming in Alaska and Siberia over the past decade, and there has been no cooling on a decadal timescale at any of the sites.

Looking at models on a coarse scale for the Northern Hemisphere, Prof. Romanovsky proposed that if the climate stays the same as it is now, then permafrost thawing may stabilize. But if warming continues, then it will be thawing around mid-century. By the end of the century, with current warming, around half of the existing permafrost area will experience thawing, he said.

Permafrost is an inertial system, so it will only lose a very shallow top layer – only about 3 to 5 metres. However, ice and carbon are the most important components of permafrost, and carbon is stored mainly in the upper parts of the permafrost. So even this thawing of upper layers will have a significant impact on ecosystems and the carbon cycle, not to mention have societal impacts:

#### Impacts of thawing permafrost on the carbon cycle

Carbon is concentrated in the upper layers of permafrost. As permafrost thaws, microorganisms in the soil decay organic matter and carbon dioxide ( $\text{CO}_2$ ) or methane ( $\text{CH}_4$ ) is released, depending on oxygen conditions. Prof. Romanovsky mentioned a

study<sup>7</sup>, which found that even localised warming will release significant amounts of carbon from the soil.

### **Impacts of thawing permafrost on infrastructure**

Thawing permafrost will have local and regional impacts on structures built on permafrost. He showed pictures of collapsed buildings and roads to highlight his point. Even the parking lot at the Geophysical Institute in Fairbanks where Prof. Romanovsky works has experienced damage due to melting permafrost. As thawing continues, maintaining infrastructure will become more expensive. In Europe and Northern Russia, oil and gas pipelines will be affected. Thawing permafrost needs to be taken into account when more pipelines are built. There is a significant area where pipelines will be disturbed.

### **Impacts of thawing permafrost on water security**

Communities that rely on surface water for fresh drinking water in the Arctic and sub-Arctic are seeing their aquifers becoming contaminated by sediments and microbes from thawing permafrost. Most places have no ways to treat the water from these sources. Banks of shorelines are also eroding, and lakes are draining as the permafrost that once contained them thaws. Twelve villages in northwest Alaska are already planning to relocate due to water security issues.

### **Impacts of thawing permafrost on food security**

Many Northern residents have traditionally used ice cellars as a means of keeping food. However as permafrost thaws, they can no longer use the cellars during the summer as they once did. This is a major issue for remote communities who rely on ice cellars. Local residents can't simply buy freezers. Aside from the great cost and difficulty to transport them, having an ample power supply to keep them running is not easy to find in remote areas of the Arctic.

Prof. Romanovsky concluded the session by asking everyone to visit [www.permafrostwatch.org](http://www.permafrostwatch.org) for more information on permafrost monitoring.

## **DISCUSSION**

A question was asked as to the role the ocean plays in contributing to the melting of the Greenland Ice Sheet.

Prof. Steffen responded that ice does not reach the ocean in that many places, but the warming ocean does have an important impact. This impact will decrease when ice retreats to the grounding line. He estimated that lubrication at the base of the ice sheet contributes to about 10% of ice loss. The impact of the warming ocean is much more important for the moment.

Prof. Steffen then asked Dr. Gerland how he's going to validate sea ice thickness measurements from Cryosat-2.

Dr. Gerland replied that there has been a lot of data validation, including several airborne and in-situ measurements taken using similar sensors.

IPF President Alain Hubert asked how much methane is expected to be released from thawing permafrost.

Prof. Romanovsky responded that warming will lead to better conditions for growing vegetation, which will sequester some of the carbon released. He gave some very

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7 Grosjean et al., 2011

rough estimates for projected emissions: in the next 100 years, 200 Gt of carbon are expected to be released as methane or carbon dioxide from thawing permafrost. Current estimates for the next century are about 2 Gt of carbon per year – although this figure is expected to increase as the planet warms and more thawing takes place. He then put this figure into context, saying that 2 Gt of carbon is only about 10 – 20 % of current greenhouse gas emissions from fossil fuel combustion.

IPF Vice-President Nighat Amin asked if there is an interaction of tides with glacier tongues in Greenland and what effect this has on the melting of the Greenland Ice Sheet.

Prof. Steffen mentioned the ice tongues already flex by about  $\pm 1$  metre. Water flows out of the fjord, and this does have some effect, but not really on the same scale as other factors that contribute to the significant overall ice loss from the Greenland Ice Sheet.

Prof. van Ypersele closed the session by mentioning that while climate models for the 2030s until 2100 show a loss of summer sea ice in the Arctic, winter sea ice does not disappear in these models.

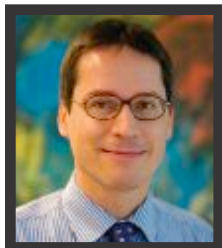
# ARCTIC OBSERVATORIES

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MODERATOR:

## BERNHARD FRIESS

*DIRECTOR OF ATLANTIC, OUTERMOST REGIONS AND ARCTIC DIRECTORATE, DG MARE, EUROPEAN COMMISSION*



The session opened with Dr. Friess welcoming everyone to the discussion about research and how to get the research done. He said he looked forward to hearing about the interesting subjects.

He introduced Dr. Richard Francis as a longstanding ESA scientist who has contributed a lot to the field of satellite observation over the last 30 years.

## RICHARD FRANCIS

*PROJECT MANAGER, CRYOSAT PROJECT*



### CRYOSAT'S CONTRIBUTION TO IMPROVED SEA AND LAND ICE THICKNESS MEASUREMENTS

Dr. Richard Francis has been involved with ESA's Earth observation satellites for the last three decades.

He began his presentation by showing the changes in Arctic sea ice extent, emphasising that he was showing the area of the sea ice, not its thickness. Using images from the National Snow and Ice Data Center (NSIDC, <http://nsidc.org/>) in Boulder, Colorado, he compared the record September 2007 sea ice minimum to sea ice cover in September 1980. Back then the Northern Sea Route was closed. The same was true for 1981 and 1982.

By 1991, when ESA launched the first ERS satellite, there still had not been that much change compared to the 1980s. Even as the ERS2 satellite was launched in 1995 and Envisat in 2002, the loss of Arctic sea ice was still not that pronounced. In the summer of 2007, the sea ice extent was very low (due to wind conditions that favoured extensive melting) and it has stayed quite low since then. He showed a commonly used curve of sea ice extent from the NSIDC, which shows a clear downward trend in sea ice cover since satellite observations began in 1979<sup>8</sup> to illustrate his point.

While sea ice extent is easy to keep track of, monitoring thickness is an entirely different game. Looking at a lead in the ice, one can see that the ice is about 2 – 4 metres. The freeboard is the part of the ice above the water, and the draught is the part of the ice below the water. The key to getting an idea of the thickness of the ice is to measure the freeboard from space – one measures the surface of the ice with respect to the ocean surface. Knowing how much ice is above the surface, one can calculate the amount of ice below the surface based on density and the laws of buoyancy.

Before Cryosat-2 was launched in 2010, ESA used ERS-1 and ERS-2 satellites to get basic information on ice. But they couldn't get to the ice edge in the Arctic or the central area of the Antarctic Ice Sheet. The resolution was also very coarse.

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8 [http://nsidc.org/images/arcticseaicenews/20111004\\_Figure3.png](http://nsidc.org/images/arcticseaicenews/20111004_Figure3.png)

ERS-1&2 were the basis of building Cryosat-1. Unfortunately Cryosat-1 crashed after launch in 2005. Its follow-up, Cryosat-2, was put into orbit in 2010, and began collecting radar data within 12 days of launch.

It was possible to see leads and ice floes. While the radar can't penetrate the ice, one can see between the top of the sea ice and leads.

There is an automatic selection of data to show leads and the surface of the sea ice. The data Cryosat-2 collects is compared to the ocean surface baseline. Cryosat-2 can fly to within 2 degrees of the pole, allowing it to take measurements closer to the pole than any other satellite before it.

NASA aircraft did flyover missions during its Ice Bridge project to validate Cryosat data, and the satellite data was "spot on".

Then Dr. Francis moved on to land ice, and had a look at Antarctica. While the Antarctic Ice Sheet rests on bedrock, some of it is below sea level, which means the ocean has access to parts of the bottom of the ice sheet. A large part of the West Antarctic Ice Sheet is below sea level. Pine Island Glacier in particular is melting due to contact with the sea beneath the glacier's grounding line.

Dr. Francis advised that we need to accumulate lots of data to get the full picture of what's going on. He is very pleased with the data so far, although he warned that the satellite is still in its early days.

He explained how Cryosat-2 takes measurements. It has two radar antennae, which makes it possible to do interferometry<sup>9</sup>. The accuracy of the interferometer is to 4 micro-radians, which is much more accurate than expected.

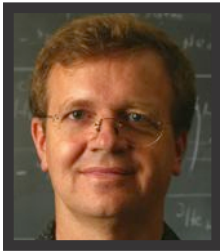
Dr. Francis concluded by giving a brief summary of Cryosat-2: Since it was launched in April 2010, it has gone through debugging processes, and its performance is significantly better than expected.

Cryosat-2 was designed to detect trends; however we need to wait until 2012 to be able look at these trends.

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<sup>9</sup> The combination of two radar signals bounced off the same point on the ground, taken at the same time, but from slightly different angles, to produce stereo images to measure height of physical features on the ground. These measurements can produce very accurate maps of height or height differentials on the Earth's surface.





## PETER SCHLOSSER

*ASSOCIATE DIRECTOR, DIRECTOR OF RESEARCH AND CHAIR, & FACULTY AT THE EARTH INSTITUTE COLUMBIA UNIVERSITY*

### TOWARDS A MULTI-DISCIPLINARY ARCTIC OBSERVING SYSTEM

Dr. Schlosser started his presentation with a short outline of the main themes his talk would be covering:

- The need for polar observing systems
- The US Arctic observing network
- Technology development
- Data Access
- International Cooperation
- Perspectives

He showed world maps from the IPCC's 4th Assessment Report published in 2007 presenting climate model projections of surface temperatures that indicate increased amplitude of global warming at high latitudes, with the Arctic warming 2.5 times as fast as other areas of the planet. Even before these results were published, the scientific community had concluded around 2003 based on sporadic measurements that the Arctic Ocean was on its way towards being ice-free during the summer. They saw no sufficient negative feedback loops to prevent this change from occurring.

Dr. Schlosser then said the need for observing the Arctic is being met through various initiatives, such as the Study of Environmental Arctic Change (SEARCH) project, IASC's International Study of Arctic Change project, the DAMOCLES project, ArcticNet, and others.

Then he put observation needs into context, explaining that meeting the scientific objectives of the Arctic Change project requires:

- Examining if such changes have happened before (paleoclimatology studies)
- Following the evolution of the changes (through integrated Arctic system observing system)
- Understanding the forcing mechanisms and feedbacks that control the changes (synthesis and modelling)
- Projection of future states of the Arctic system
- Understanding the interaction between changes in the physical/chemical, biological, and human domains ('Human/Environment Interface').

Good, long-term pan-Arctic observations can lead to modelling and process studies, Dr. Schlosser said. This in turn can be transformed into applications for stakeholders living and working in the region, who will need to know how changes in the Arctic will affect them.

Recommendations for an Arctic Observing System over the past decade have led to long-term observatories (LTOs). The IPY gave a major boost to in-depth observing systems.

The US Polar Research Board's Arctic Observing Network report confirmed and supported the SEARCH observing system plan for long-term Arctic research network. Observation programmes also received funding under the American Recovery and Reinvestment Act (ARRA).

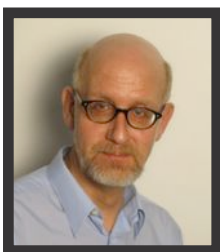
Dr. Schlosser discussed the US National Science Foundation (NSF) Arctic Observing Network (AON). He said NSF grants to support the development of the AON have been made to 21 IPY projects. Increased investment has been made in observatories. Total investments over the last 12 fiscal years amount to \$113 million USD.

Ocean and sea ice observation programmes receive by far the most funding from the NSF. Hydrology and the rest of the cryosphere receive less funding, while terrestrial ecosystems receive comparatively little. It is interesting to see where the funding goes, he remarked.

The US decided to focus on observing the North American side of the Arctic, as DAMOCLES was focussing on Eurasian side of the Arctic. Ice-tethered profilers (ITPs), platforms, atmospheric monitoring stations, buoys, gliders, stations for monitoring the hydrosphere and cryosphere, and a few stations for terrestrial ecosystem studies were funded under the NSF's Arctic Observing Network.

In the Freshwater Switchyard Region of the Arctic – the unexplored region of the Arctic Ocean that lies to the north of the eastern Canadian Archipelago and Greenland, extending about 500-800 km into the central Arctic Ocean up to the North Pole – a modular rosette system that can be launched and recovered from aircraft in ice-covered waters through a small hole in the ice was deployed to collect water samples from the ocean surface to a depth of 600 metres. It's possible to get good representative samples to look at ocean temperature, salinity, currents, and geochemical freshwater tracers such as oxygen isotopes, tritium ( $^3\text{He}$ ), CFC's, sulphur hexafluoride ( $\text{SF}_6$ ) and nutrients.

In his conclusion, Dr. Schlosser said the IPY provided the impetus to implement the Arctic Observing Network. Similar efforts are needed to implement projects such as the Global Earth Observation System of Systems (GEOSS), a group run by the Group on Earth Observations which seeks to link together existing and planned Earth observation systems from around the globe and supports the development of new systems where there is a need. It is important to sustain existing components put in place during the IPY and to operationalise other components that are not yet operational.



## ARI SEINÄ

*HEAD OF ICE RESEARCH AND ICE SERVICE, FINNISH METEOROLOGICAL INSTITUTE*

### THE NEED FOR IMPROVING AND EXTENDING PAN-ARCTIC EARTH OBSERVATION CAPABILITIES

Ari Seinä opened his presentation by asking the following questions:

- Why is the Arctic important?
- What will change with climate change?
- What type of satellite data is needed?
- What kind of satellite data is available?
- How can satellite data be used?

As Head of Ice Research and Ice Service in the Marine Research Unit of the Finnish Meteorological Institute, he is mostly concerned with maritime transportation in the Baltic Sea.

Mentioning the recent record low Arctic sea ice extents in September 2007 and 2011, Mr. Seinä said there's nonetheless still a lot of ice in the Arctic, and the sea ice maximum extent in the winter has not changed much over the last 30 years.

Oil and gas development plus the opening of possible major shipping routes through Arctic waters will bring more traffic to the Arctic. Models predict that somewhere between 2030 and 2050 the Arctic Ocean will be ice-free in the summer.

Mr. Seinä described how the sea ice in the Arctic is monitored. Large-scale ice mapping is done using Envisat Advanced Synthetic Aperture Radar (ASAR), which gives coverage at a 1 km resolution, with a small gap at the poles.

Small-scale ice mapping is also going on and many satellites are charting ice cover. A number of missions are taking place in many different nations from 2011 to 2015.

He mentioned some of the ongoing issues facing Earth observation services:

- Heavy cloud cover and the long polar night in winter impede the use of optical remote sensing capabilities. There is a need for cloud and daylight independent data collection methods.
- Both large-scale and small-scale ice charting should be done all across the Arctic. It is currently done only in certain regions by national services.
- Data policy should be re-investigated. Some satellite data are owned by private companies that don't readily share data. The European Space Agency (ESA) currently provides data free of charge. Mr. Seinä believes providing data free of charge is the right thing to do. However providing data is expensive, so funding mechanisms need to be in place to keep the data coming in.
- Long-term commitments from Earth observation data providers are needed to make sure services for end users stay in place. Services and products based on Earth observation data such as satellite data need to be translated from raw data collected so end users can make use of it.

In conclusion, Mr. Seinä said these issues should be kept in mind as the length of the sailing season and economic activity in the Arctic increase. He underscored that Earth observation infrastructure needs to be updated to meet these new demands.



## LASSE PETTERSSON

*DIRECTOR OF INTERNATIONAL COOPERATION AND MARKETING, NANSEN ENVIRONMENTAL AND REMOTE SENSING CENTRE, BERGEN*

### FOCUS ON ARCTIC ROOS OCEAN OBSERVING SYSTEM

Mr. Pettersson opened his presentation echoing a point that Mr. Seinä had made in his presentation: that space agencies provide data, but these need to be translated into usable information for end users. This task is a lot of work, he said. The raw data needs to be transformed into information captains on ships can use instantly while navigating. They are too busy to interpret raw data themselves. Getting this information to ships in a timely manner is essential for safe and efficient operations.

Arctic ROOS <http://www.arctic-roos.org> is an observing system for sea ice and the ocean based on satellite and in-situ platforms. It was established by a group of 14

member institutions from nine European countries which have the goal of fostering and developing the Arctic component of the Global Ocean Observing System (GOOS - <http://www.ioc-goos.org>).

Looking at Arctic sea ice cover, Mr. Pettersson noted that the Arctic is covered by 12 million km<sup>2</sup> of sea ice during its winter maximum and only just over 4 million km<sup>2</sup> of sea ice during its summer minimum. He indicated that the extreme sea ice minimum extent in September 2007 was in part caused by anomalous wind patterns, so one could argue whether it was really a true minimum. There is also natural variability in the climate system one must consider.

He compared sea ice algorithms scientists and modellers use to determine the amount of sea ice. There is a margin of error of up to up to 1 million km<sup>2</sup> for an area of 12 million km<sup>2</sup> depending on the algorithm used. Arctic ROOS has been getting daily Arctic sea ice drift data since 2002. They get sea ice thickness from models. They also receive laser altimeter data from the IceSat satellite.

Using satellite passive microwave data, it has been possible to derive the thickness of thin sea ice. Data from Cryosat-2 will improve estimates.

The Norwegian Meteorological Institute (NMI) produces regional ice charts based on a manual description of satellite data. Along the Northern Sea Route, the depth of the navigation lane varies, but is not very deep – 8 metres in some areas – making it impossible for huge vessels to travel through these areas. There are bottlenecks where ships have to pass between islands.

The Russians have found a solution to ice concentration by building Russian nuclear icebreakers with a lot of power, so navigating through ice isn't much of a problem for them. But even powerful icebreakers need sea ice information. Remote sensing products improve the efficiency of operations. Mean convoy speeds are higher if they have information from satellites, particularly in winter when ice concentrations are highest. Maritime transport is more efficient and safer.

Mr. Pettersson stressed the importance of using a combination of observations together with modelling tools in making sea ice predictions. Looking at ocean simulated surface circulation between 1970 and 2000, it is possible to create models that predict sea ice cover. The length of the navigation season is increasing, and models show a change of ice edge location in the Barents Sea, with the ice edge retreating at the end of winter. Currents in the Arctic may change, and this could have a wide variety of implications.

Mr. Pettersson ended by outlining the challenges facing Earth observation and marine transport in the Arctic:

- Improving global coupled Earth system models that focus on the Arctic.
- Making a better distinction between natural and anthropogenic climate variability.
- Developing and employing improved ice thickness measurement techniques.
- Validating remote sensing products.
- Improving observations and forecasts on a scale from decades to days.
- Improving infrastructure to support shipping.
- Determining market drivers for transport in the Arctic.
- Determining whether there is a commercial year-round transport market in the Arctic.

## DISCUSSION

Tom Barry, Executive Secretary of CAFF, asked if there were any Earth observation programmes looking at biodiversity.

Lasse Pettersson said they have also been working on vulnerabilities of marine and sea ice-based ecosystems, but that it wasn't possible to present everything in his talk.

Prof. Konrad Steffen from the University of Colorado asked if ESA was now making plans for a Cryosat-3, given that the operational lifetime for each satellite is short.

Dr. Richard Francis responded that a Cryosat-3 project would require a budget. ESA is thinking about the next decade. However Dr. Francis pointed out that Cryosat-2 has been built with back-up systems, and the expected lifetime of Cryosat-2 should be 12 years or more.

Bernhard Friess asked how far we are from commercially viable ice information service packages for ships to use in the Arctic.

Lasse Pettersson said that you need to do long-term training to teach the ships' crew how to use this information, and it also requires full pan-Arctic coverage. There is a long way to go in this regard.

Dr. Bernhard Friess asked a follow-up question as to whether a sea ice product needs a helpline where people can contact the service provider, rather than the service provider simply delivering a package.

Lasse Pettersson responded that to start with, ships need to have the capability to receive this information, and it is necessary to teach those who will eventually use these services how to use them. He remarked that end users and service providers were learning from each other, and this process takes time. Researchers can also benefit from the data these Earth observation systems collect. He also pointed out that SAR (synthetic aperture radar – the kind radar on satellites that can penetrate clouds and take images in total darkness) global coverage was good, but the challenge is that a lot of people don't really know how to use or interpret the data.

IPF Vice-President Nighat Amin made a point about how satellite data for Antarctic operations was readily available and free, and how useful this was to those going to Antarctica.

Knut Espen Solberg from Det Norske Veritas commented that there are currently no standards for educating mariners on how to make use of remote sensing data. But he said there are plans to address this.

# PERSPECTIVES ON NATURAL RESOURCE EXPLOITATION IN THE ARCTIC

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## MODERATOR: **CHRIS SOUTHCOTT**



*DEPARTMENT OF SOCIOLOGY, LAKE HEAD UNIVERSITY; RESEARCH OUTREACH PROGRAMME TEAM, UNIVERSITY OF THE ARCTIC*

Note: Unforeseen events prompted a slight change in the programme from what was originally scheduled. Geir Tommy Pedersen, a Representative from the Sámi Council who was scheduled to speak on Friday morning, spoke during this session on natural resources. A representative from ArcelorMittal who had originally been scheduled to speak about the Mary River mining project taking place in Nunavut Territory in northern Canada had to cancel, but sent a presentation that was read out during the Friday morning session.

## **OLE ANDERS LINDSETH**



*DIRECTOR GENERAL, NORWEGIAN MINISTRY OF PETROLEUM AND ENERGY*

### **NORWEGIAN PERSPECTIVE ON OIL & GAS DEVELOPMENT IN THE ARCTIC**

Mr. Lindseth opened his presentation by reminding everyone that the global need for energy continues to rise, and fossil fuels remain dominant in the energy mix. Coal, oil, and natural gas are the main sources of energy, along with nuclear and renewable energy to some extent.

He outlined what should be done in light of the current reality:

- 1 In order to deal with this rising demand, we not only need to find and extract more oil and gas, but also produce and consume fossil fuels in a more benign and efficient way.
- 2 Moving from oil and coal-fired power stations to gas would reduce carbon emissions while meeting energy needs.
- 3 There are vast opportunities for cutting energy consumption. Ways to cut energy consumption are often underrated policy tools.
- 4 There needs to be a much greater effort to use renewable energy sources. However each renewable source needs to stand the life cycle test to determine how renewable it really is.

Norway is now the second largest exporter of oil and gas in the world. These exports count for a large share of Norwegian GDP, and there are a large number of oil and gas pipelines from Norway to the European Mainland. This is an important energy line, he said. Norway is a stable provider of energy to Europe, and can continue doing so at current production rates until 2040 or so.



He then addressed the status of the Norwegian continental shelf. While most maps of Europe don't show this vast area north of Norway, it stretches quite far – as far as 85°N. It is open ocean that requires diligent management. There are a number of different users of this maritime region, and they must take into account environmental and climate concerns. More and more areas of the Arctic Ocean are becoming ice free, which means new shipping lanes and greater access to more resources.

Mr. Lindseth reminded the audience that the Arctic Ocean is governed by the UN Convention on the Law of the Sea, and that Norway and Russia have delimited their continental shelves bilaterally, as have other Arctic States. He also reminded everyone of the United States Geological Survey (USGS) evaluation that the Arctic contains about 22% of the world's undiscovered yet technically recoverable resources in the world, with about 13 % of the undiscovered oil, 30 % of the undiscovered natural gas, and 20 % of the undiscovered natural gas liquids in the world, with about 84 % of these resources expected to occur offshore.<sup>10</sup>

Several Arctic States show it is possible to have sustainable oil and gas production in the Arctic, said Mr. Lindseth. With 4 million people living in the Arctic, resource management is essential to safeguarding local communities in the High North.

Norway has seen tremendous changes recently. The Barents Sea is an emerging frontier area, Mr. Lindseth said. The delimitation agreement between Norway and Russia signed on 15 September 2010 and which entered into force on 7 July 2011 has led to people moving back to remote areas. Young girls tend to leave these remote areas first. When economic growth returns, they tend to return, many of them with relevant education. This is good for the Arctic at large, he argued.

He remarked that those who sit in capitals far away from the Arctic think they know best. In fact, people living in the Arctic would like to see economic development.

Norway's aim is sustainable development, which means balancing:

- Economic activities
- Social dimension
- Climate and environmental concerns

This portends that there will have to be a balancing of risks. There is always going to be a probability of risk, Mr. Lindseth argued. The key, he said, is to do a thorough cost-benefit analysis and make decisions based on facts, not on emotions.

In conclusion, he said that good governance includes addressing matters of substance, sound processes, includes all stakeholders, and fosters relations between all relevant actors. Good dialogue between policymakers, administration, and industry is key.

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<sup>10</sup> Taken from USGS Press release "90 Billion Barrels of Oil and 1,670 Trillion Cubic Feet of Natural Gas Assessed in the Arctic" from 23 July 2008.



## DANILA BOCHKAREV

RESEARCH FELLOW, EAST-WEST INSTITUTE

### POTENTIAL EFFECTS OF ARCTIC OIL AND GAS DEVELOPMENT ON GLOBAL ENERGY SECURITY

Dr. Bochkarev opened his presentation by again reminding the audience of the USGS estimates of technically recoverable oil and natural gas resources in the Arctic (see Mr. Lindseth's presentation for exact figures). With 84% of these resources estimated to occur offshore, this poses environmental challenges, he said.

Using a map, Dr. Bochkarev indicated where major natural gas reserves lie around Norway and north of Alaska. Oil resources are more equally distributed around the Arctic than natural gas reserves, apart from possible major finds off northern Alaska.

The major hydrocarbon provinces are:

- West Siberian Basin
- Arctic Alaska
- East Barents Sea

Already two important gas fields have been set up between Norway and Russia, and more off the coast of northern Russia. Dr. Bochkarev indicated on a map the pipelines coming from Western Siberia and the Yamal Peninsula to the Eurasian mainland.

Focusing on the Yamal LNG "megaproject", Dr. Bochkarev cited estimates from Russian state energy company Gazprom of 16 trillion cubic metres (tcm) of explored and preliminary estimated gas reserves, and nearly 22 tcm of in-place and forecast gas reserves.

He then looked at large reserves vs. high production costs to put exploitation of hydrocarbon resources in the Arctic into perspective:

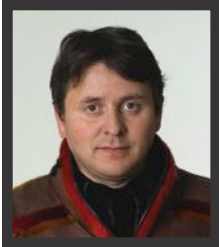
Oil production per tonne in the Middle East costs \$5-10 USD per tonne from currently developed fields; \$30-60 for currently developed fields in Russia. At the moment, oil production on the Arctic Shelf costs \$200-300, not including the cost of infrastructure. Making exploitation in the Arctic worthwhile will require tax breaks and high oil prices.

The Yamal LNG project is a good example of tax break incentives making Arctic Rim exploitation projects possible. There will be zero export tax and zero extraction tax for projects on Yamal Peninsula starting from 1 Jan 2012. This is also the case for other areas in Russia for onshore development for the next 12 years.

Dr. Bochkarev emphasised that technology and its price is essential. Sea ice dynamics and ease of transport will have an impact on oil and gas delivery and market access. He pointed out that natural gas prices can vary by as much as a factor of four.

No exploration and production would be possible without tax incentives and major partnerships with industry to develop new extraction technologies. Oil production in the Arctic will be more environmentally challenging and will require new technological solutions to be developed. Since development projects tend to cost upwards of \$25-

50 billion USD, one needs to be sure before embarking on such a project. The question is how to quantify the risk.



## GEIR TOMMY PEDERSEN

*REPRESENTATIVE OF THE SÁMI COUNCIL*

### REPRESENTATION OF INDIGENOUS PEOPLES IN THE EUROPEAN INSTITUTIONS

Mr. Pedersen gave a short introduction of himself, mentioning that he is a Member of the Sámi Parliament in Norway and a Member of the Board of the Sámi Council. He explained that the Sámi Council is an umbrella organisation for Sámi organisations from the Norwegian, Finnish, Swedish and Russian sides of the traditional Sámi territory. He made it clear that he was representing the Norwegian Sámi Association at the conference.

The Arctic is often seen from the outside world as one of the last untouched wilderness that is being affected by climate change, he said. The indigenous peoples of the North have been living in the Arctic for thousands of years and have developed an understanding of these surroundings. The Sámi have a special understanding of the Arctic landscape, its fauna and its flora. It is the home of their ancestors, where they raise their children and it is their cultural landscape; it is not a wilderness.

With a rapidly growing global population there is a higher demand for resources, both renewable and non-renewable. The increasing rapid rate of climate change and the demand for new resources poses new challenges to the resilience of the life of the indigenous peoples. Mr. Pedersen pointed out that Arctic societies have a long history of resilience based on their ability to adapt quickly to changes in the ecosystems on which they depend and to profit from these changes.

Yet the sum of these factors threatens to overwhelm the adaptive capacity of some Arctic populations and ecosystems. Many of the stresses brought about by human activities such as air and water contamination, overfishing, mining and resource development are affecting populations, and man-made climate change is making it easier to access the Arctic regions, creating “a new resource race”.

Indigenous peoples need to be involved in determining how to respond to these changes and need to be part of the decision-making processes, because it is their homeland.

The life and economy of indigenous peoples is based on the ecosystem. He highlighted the importance of taking a holistic human-ecosystem approach when making decisions that can affect the livelihoods of indigenous peoples: “In our struggle to understand these links between humans and nature, we all should take a holistic human-ecosystem approach.” By this, he meant that one should not try to treat the human in isolation, but rather as an actor who is part of an ecosystem.

After the fall of the Soviet Union, the border with Russia opened and this dramatically changed the possibilities of co-operation with Sámi brothers and sisters on the Russian side and the other indigenous peoples. These changes and the establishment of the Arctic Council, where the indigenous peoples were invited to participate as permanent participants, are important milestones in the acceptance of the rights of indigenous peoples.

On the subject of the Barents Euro-Arctic Council, Mr. Pedersen said full indigenous participation is needed. So far he has had a positive response from all stakeholders.

There is often an implementation gap between ideas and reality. Some governments and national parliaments do not possess the necessary political will to effectively implement their international obligations towards indigenous peoples.

Turning to the contentious issue of the EU's ban on importing sealskin products, he said the decision was not based on any scientific evidence, and that the EU has created problems with many indigenous peoples with the ban.

He lauded the EU's commitment to entering into a dialogue with indigenous peoples and praised the idea of an Indigenous Peoples' Secretariat and Indigenous Peoples' Working Group within the EU institutional framework. Mr. Pedersen fully supports their establishment as well as indigenous peoples having the right to speak for themselves in the EU Parliament.

He reiterated the demand from the world's indigenous communities to the EU to start to revise the EU policy towards indigenous peoples from 1998. This policy needs to be updated so it is compatible with the UN Declaration of The Rights of Indigenous Peoples, he said.

The presentation ended with Mr. Pedersen discussing the preservation of indigenous cultural identity and language. He gave special mention to the Sea-Sámi festival Riddu, which was established by local Sámi youth in 1991 and has since become one of the largest yearly international festivals for indigenous peoples. Sámi youths have "found new ways in old patterns," he said.



## JAN THOMPSON

*SENIOR ADVISOR, NORWEGIAN MINISTRY OF THE ENVIRONMENT*

### BALANCING STAKEHOLDER INTERESTS IN THE ARCTIC

In his talk, Mr. Thompson gave an overview of the Norwegian Integrated Marine Management system and how it functions. He showed on a map the Norwegian Exclusive Economic Zone (EEZ), which covers 2.7 million km<sup>2</sup>, 1.5 million of which lies in the Arctic.

It is an integrated ecosystem-based management system, which means it is taking into account cumulative effects of all human activities on the marine environment. Management of human activities is based on the limits within which ecosystem structure, functioning, productivity and biological diversity can be maintained. The ecosystem approach is looking at:

- The ocean geophysical environment
- Biota (there are limits within which ecosystem structures can function)
- Activities (such as petroleum and gas exploitation and shipping) and their impacts

The plan takes into account impacts of human activities (petroleum activity and shipping, fisheries, climate change, ocean acidification and long-range transport of pollutants) in the Arctic, looking towards the 2025 horizon. This includes the assumption that exploration and production of hydrocarbons will increase and shipping will increase.

Fisheries have had a great impact on the Arctic environment, but through careful planning they have become better managed in recent times. For example, cod fishing has improved, with commercial species being fished within safe biological limits.

However cumulative effects of climate change, ocean acidification and long-range transport of pollutants can become a major threat.

Mr. Thompson then outlined the steps towards creating an integrated management plan, which include:

- 1 Establishing a scientific basis.
- 2 Assessing pressures from different sectors.
- 3 Assessing the overall pressures and impacts.
- 4 Devising the integrated management plan.

There is an open participatory process, which includes consultation with all stakeholders.

The management plan should be based on currently available knowledge. Building up a body of scientific data is essential. He emphasized that decisions should be founded on a rational, fact-based process.

After this, one must create a map of where the different resources are located. It is important to map particularly valuable (in terms of resources) and vulnerable (in terms of ecosystems) areas that require special attention. There must be clear criteria to support the selection of these areas.

Then one must map current and planned patterns of shipping traffic, fishing activities, and oil and gas development. Spatial mapping can be particularly helpful, especially for shipping traffic. Some areas have seasonal variation in activities, which should be taken into account. Under the current framework, there will be no further activities until the next management plan has been put in place.

He stressed that the plans need to be regularly updated and scientific research projects need to feed information into the management scheme. He also highlighted the broad involvement of stakeholders and involvement of many government ministries.

In terms of how the work is organised and who participates, the steering committee for the management plan is at ministry level.

Originally, four ministries were involved:

- Environment (lead ministry)
- Petroleum and Energy
- Fisheries and Coastal Affairs
- Foreign Affairs.

Now 11 ministries have become involved.

There are also three advisory groups:

- Monitoring

- Management
- Risk

He concluded by stressing the importance of open communication between stakeholders to balance sometimes conflicting interests. He also emphasized the need for decisions to be scientifically-based.

## DISCUSSION

Eric Turner from AECOM asked whether it is normal to require higher levels of regulation for the oil and gas industry concerning pollution containment in the Far North of Norway.

Ole Anders Lindseth responded that Norway is not the best example to look at in the Arctic due to the North Atlantic Drift and the fact that the Barents Sea is largely ice-free. Water depth is comfortable at around 300 metres. The engineering and technical requirements are not much different from the continental shelf of the North Sea. The only main difference is that it is dark for several months in winter.

He added that requirements in Norway are very strict as a general rule, and awareness of this is very strong, as oil takes a long time to degrade naturally. There are also very prolific areas of biological production off the coasts of Norway, so one must be very careful.

Mr. Turner then asked Geir Tommy Pedersen how indigenous peoples feel about oil and gas exploitation in their homeland.

Mr. Pedersen replied that there is no dialogue between the Sámi and the Norwegian national company, Statoil, or the Norwegian government on these issues. He said it is easier to talk to foreign companies.

Danila Bochkarev asked the Norwegian representatives on the panel for more details about the moratorium on oil and gas drilling Jan Thompson mentioned in his presentation, and whether there would need to be any new tax regimes to get production moving, as is the case in Russia.

Mr. Lindseth responded that one never knows if one is going to hit oil or natural gas when doing exploratory drilling. Natural gas needs to be flared. Oil is easier to transport, but standards are more or less the same for oil and gas. Mishaps at gas fields have consequences, but are not as bad as mishaps at oil fields. He mentioned the Norwegians have started seismic surveys to explore for new fields in their region of the Barents Sea, but he's not sure when the Russians will start to explore their side.

He then addressed the second part of Dr. Bochkarev's question by saying that he doesn't foresee any need for a regulatory framework or tax system. The Norwegian and Russian tax systems are totally different. On the Russian side, there needs to be discussion on tax levels, but this has to be dealt with by the Russian government.

Erik Gant from the Indigenous Peoples' Secretariat at the Arctic Council asked for Mr. Pedersen's thoughts regarding the regulatory framework of the Norwegian Government.

Mr. Pedersen referred to the integrated marine management plan. The main spawning ground of cod is in this area of traditional Sámi waters, so this is a concern he said, and the area needs to be protected, and the right approach should be taken. The fish and hydrocarbons in Sámi waters belong to the Sámi. He stressed that his people need to be involved in developing these resources.



The big concern Mr. Pedersen said the Sámi have is preparedness for an oil spill. He has taken part in working groups on the Arctic Council regarding this issue, and said that response time in winter, when chances for an accident are greater, would be slow. Looking at different possible oil spill scenarios, in the dark of winter with the encumbrance of ice and snow, there's hardly anything one can do, so it is impossible to be totally prepared. Mr. Pedersen argued that no one is even ready for oil and gas mishaps that might happen today.

Prof. Konrad Steffen from the University of Colorado asked what is the scientific basis for a statement Jan Thompson had made that increased shipping is a bigger threat than oil exploration.

Mr. Thompson replied that the statement doesn't have any scientific basis, although it is justified because most oil development activities are taking place far from the shore, and oil needs to be shipped elsewhere to be refined. Spills from ships seem to be more problematic than those that occur during oil drilling. Oil leaking from a ship is more concentrated, whereas leakage from oil drilling is more easily cleaned up by nature.

An audience member asked whether there was a difference in risk between onshore or offshore drilling off the coast of Norway.

Mr. Lindseth said there is no onshore drilling in Norway.

Lasse Pettersson from the Nansen Centre remarked that there are lots of resources in the Arctic and they are going to be exploited, and that in Russia, most of these activities are taking place onshore, not offshore. He asked what will be Russia's priorities – if they will go for the low hanging fruit and drill onshore, or if they would ever drill offshore.

In response, Dr. Bochkarev pointed out that there is already a small amount of oil and gas development taking place offshore in Russia, and that the dynamics of production are moving north. The Shtokman Fields, which are located offshore and are close to European markets, don't require much icebreaking to be reached. He mentioned the Murmansk pipeline to the US, however there is not much energy demand in the US market. Europe is where the energy demand is. It is a wait and see situation whether there will be tax breaks or other incentives in Russia to foster development. In the north of Yamal, there is a field the size of two Shtokman Fields, but it is too expensive to develop, and the market is too far away from the source of extraction. So development of this region is not happening as soon as had been predicted.

Mr. Lindseth added that Europe will probably need more gas because consumption will increase and it is inevitable that natural gas will become a substitute for coal and oil for energy production. The pipeline grid is there and the reserves are there. Both Norway and Russia now provide 50% of the natural gas Europe consumes, and long-term supplies are fairly stable.

Zuzanna Bieniuk from the European Commission commented that she was very impressed by the cross-cutting nature of the panel. She thanked Mr. Thompson for his presentation in particular and said that Norway sets high standards for ecosystem-based management. She then asked if the Norwegians try and promote this model to other Arctic nations and if he thinks there will ever be a pan-Arctic management system.

Mr. Thompson responded there is bilateral cooperation with Russia at the moment in this area. The main project and aim is to develop a plan for the Russian part of Barents Sea similar to the one governing the Norwegian side in order to avoid any discrepancies between the management regimes each country uses to manage the same ecosystem. He said he has also been to Canada advocating this approach, and there is some interest.

Mr. Lindseth concurred with Mr. Thompson, stating that it is good to see the Barents Sea as a joint Russian and Norwegian Sea. He said there are comfortable thresholds for viable and sensible resource management. However, Mr. Lindseth admitted that it is hard for him to envision one management scheme for the whole of the Arctic as there are so many different areas involved. The Barents Sea is a very different part of the Arctic due to the fact that the Gulf Stream makes it a bit warmer. He said it might be possible to have one general framework plan that can be adapted to different areas accordingly.

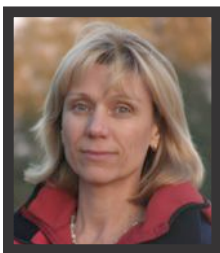
Mr. Pedersen added that there is no plan looking at the social dimensions of developing resources such as fish, oil and gas, and was disappointed that most research money goes into the natural sciences and not enough goes into examining the social impacts on local communities. He stated that there is a lag in the integrated management system and that Norway is looking at these as national resources rather than looking at these development issues at a local level.

Steffen Webber from the EU Arctic Forum asked whether Norway would ever see the need for European actors to be involved in exploitation management.

Mr. Lindseth responded that the Arctic Ocean is governed by UNCLOS, so it is no different from elsewhere, and that there is no rush for resources. He added that Norway uses the EU hydrocarbon licensing process, and that it is an open and transparent process. Over 40 companies are exploiting hydrocarbons in Norwegian territory.

# FRIDAY 14 OCTOBER 2011

*Following an opening presentation on the EU Arctic Information Centre initiative, which is being led by the University of Lapland, the final day of the Arctic Futures Symposium 2011 focused on the perspectives of indigenous peoples and the economy of the North. The day closed with a keynote address delivered by French Ambassador to the Polar Regions and former Prime Minister of France, HE Michel Rocard.*



## PAULA KANKAANPÄÄ

DIRECTOR OF THE ARCTIC CENTRE, UNIVERSITY OF LAPLAND

### THE ARCTIC INFORMATION CENTRE: A NETWORK OF EUROPEAN ACTORS WITH EXTENSIVE ACTIVITIES IN, AND KNOWLEDGE OF, THE ARCTIC

Prof. Paula Kankaanpää presented the EU Arctic Information Centre (EUAIC) project she and the University of Lapland in Rovaniemi, Finland is spearheading. The centre is intended to be a network of networks that act as a boundary organisation<sup>11</sup> that bridges the divide between the EU and Arctic stakeholders. She remarked that the project is only in the planning stages at the moment.

The project proposal was developed by the Arctic Centre following the publication in November 2008 of the Communication from the European Commission to the European Parliament and European Council entitled “The European Union and the Arctic Region”, which suggested exploring possibilities for creating a European Arctic Information Centre.

The proposed initiative will establish the EUAIC as a network of European Arctic institutions headquartered in Rovaniemi, Finland. The EUAIC initiative has been taken up by the EU, the Arctic Council, and the Finnish Government.

Offering reasons why the University of Lapland and a number of other partner institutions (including the International Polar Foundation) are interested in establishing the centre, she explained that the Arctic is changing rapidly and that it

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<sup>11</sup> Institutions that reach across the gap between two different domains and promote cooperation around a common interest. Boundary organisations are able to act beyond the boundary of each domain while remaining accountable and authoritative in each domain, as well as facilitate the flow of information across boundaries, fostering dialog and exchange.

is still possible to learn from history and manage the development of the Arctic in a sustainable way. She underscored that the key elements to sustainable development in the Arctic are knowledge, technology and understanding, and that decisions should be made based on reliable information.

She referred to case studies on agriculture, ground water management, weather forecasting, air pollution and fisheries management in the US, South America, Africa and Europe as instances where information and knowledge was used effectively as a basis for developing sound projects.

Arctic stakeholders require information, and that information must be credible, relevant and legitimate. If the information meets these three criteria, it is much more likely to be influential.

Boundary organisations offer a platform of integrated knowledge systems as well as mediation to bridge scientific research and knowledge with policy decisions and actions. EU Arctic policies all support sustainable development in the Arctic as well as many Arctic research and education initiatives. However there is a need for proper outreach to various interest groups.

The proposed Arctic Information Centre's Primary Mission is collecting and communicating this information and making it available to stakeholders in a timely manner.

The services to be provided by the EU Arctic Information Centre are the following:

- Facilitating the information exchange between the EU institutions and the Arctic.
- Acting as a gateway to Arctic knowledge.
- Providing information on Arctic peoples and governance information services.
- Undertaking outreach and communication activities.
- Developing syntheses, maps and a visualisation service.

The EU AIC network consists of a group of 15 institutions. The aim is that the EU Arctic Information Centre will:

- Provide access to timely, rapidly available and useful information. The centre envisions delivering regular briefing analyses about the Arctic Council, the Barents Euro – Arctic Council, the EU's Northern Dimension Policy, EU activities related to the Arctic, operations, projects, research results, and so on. The centre would provide information aggregation and analysis. End users would include EU Parliamentarians, indigenous peoples, industries working in the Arctic and other Arctic stakeholders.
- Foster interactive service and dialogues with indigenous peoples in order to help different groups participate in producing knowledge. There would be targeted support and services for the EU's Arctic indigenous population, the Sámi.
- Coordinate outreach initiatives, libraries and education services such as exhibitions, cooperation projects with schools and libraries, and information campaigns.

Prof. Kankaanpää mentioned that the next step is an EU Parliament's Preparatory Action. The EU Parliament was considering a proposal to support the idea of the EUAIC

into the European Union's budget<sup>12</sup>. The product of this Preparatory Action will be a Strategic Impact Assessment of the Development of the Arctic. The EU Commission will then decide on further steps to establish the EUAIC.

## INDIGENOUS PERSPECTIVES AND THE ECONOMY OF THE NORTH

MODERATOR:

**ROBERT CARSON**

*FELLOW, CIRCUMPOLAR AFFAIRS, QUEEN'S UNIVERSITY*



Mr. Carson began by echoing what the President of Iceland, the Deputy Minister of Foreign Affairs of Greenland and the representative from the Sámi Council had said earlier: indigenous peoples of the Arctic have the right to determine how their areas of the Arctic are developed.

He mentioned the Circumpolar Inuit Declaration on Resource Development Principles in Inuit Nunaat ([http://inuitcircumpolar.com/files/uploads/icc-files/Declaration\\_on\\_Resource\\_Development\\_A3\\_FINAL.pdf](http://inuitcircumpolar.com/files/uploads/icc-files/Declaration_on_Resource_Development_A3_FINAL.pdf)) released by the Inuit Circumpolar Council (ICC) describing how economic development should occur in areas where Inuit people reside. The self-determination of peoples living in the Arctic has a settled political framework, he said; the other aspects of self-determination are the sociological and economic aspects. These aspects must be taken into account as the indigenous peoples of the Arctic become self-reliant in the 21<sup>st</sup> century.

Following his opening remarks, Mr. Carson introduced Mr. Thierry Touchais, Executive Director of the International Polar Foundation, who read aloud a presentation on the Mary River Mining Project on behalf of Phil du Toit, Vice President of ArcelorMittal and Head of Mining Projects and Exploration, who was not able to be present at the symposium.

**PHIL DU TOIT**

*EXECUTIVE VICE PRESIDENT OF ARCELORMITTAL, HEAD OF MINING PROJECTS AND EXPLORATION*



### TOWARDS A SUSTAINABLE DEVELOPMENT OF THE MARY RIVER MINING PROJECT

Mr. Touchais forwarded the apologies of Mr. du Toit for his unexpected absence and said he would be happy to take any questions there might be and forward them to Phil du Toit, and forward any replies he may offer.

What follows is the text provided by ArcelorMittal describing the Mary River mining project:

<sup>12</sup> Budget was voted and approved 30 November 2011.

*At approximately \$6 billion this is the largest mining development currently planned in Canada, by far the largest mining development ever planned above the Arctic Circle. Predicted to deliver >4\$ billion in revenues to the aboriginal governments of Nunavut with additional revenues specifically to Baffinland Inuit (Qikiqtani Inuit Association) through an Impacts and Benefits Agreement.*

*Project: A twenty year, 18 million tonnes/year, iron ore project requiring a \$5.9 billion capital investment in an iron ore mine, 2 supporting fly-in/fly-out camps and associated infrastructure, the world's most northerly railroad, 2 operating ports including one capable of berthing the required 8 yet-to-be-built Cape-size icebreaking bulk carriers (200,000dwt). Peak employment during 4 year Construction phase of > 4,000 people. Peak employment during 20 year Operations phase of >700 people.*

*Context: World iron ore demand continues to grow with urbanization and expansion of the middle class in both India and China. Global supply is increasing to meet market needs but high grade, 'lump' deposits are becoming increasingly rare as lower grade 'fines' projects become the norm. Mary River is exceptionally high grade with a high proportion of lump, making it exceedingly attractive to both European and Asian markets.*

*Company: Baffinland Iron Mines is the Canadian, Toronto based company that holds the mineral rights to develop the property. Its management has the combined experience of similar northern mining projects through all phases of aboriginal consultation, permitting, construction and operation. These projects (specifically Voisey's Bay, Diavik and Ekati) have all raised the bar in safety, environmentally responsible projects that deliver significant and long-lasting benefits to aboriginal people while becoming important economic generators locally and nationally.*

*Baffinland Iron Mines is 70% owned by ArcelorMittal (AM), owner of former Dofasco and Quebec Cartier Mining. In May of this year AM announced a \$2.1 billion dollar investment in its Quebec operations creating 8,000 construction jobs and 900 permanent jobs. AM is the world's largest steel maker with 230,000 employees worldwide. With Mary River, AM's proposed total Canadian investment is \$6B.*

*Benefits: Training and long-term employment of local Inuit. Long-term sustained income to Nunavut that reduces dependence on federal funding. Development of an Inuit business community by a willing and supportive long-term customer. A demonstration that large, environmentally responsible industrial projects are possible in Canada's north. A general elevation in individual and community capacity and an increasing ability to find healthy futures. A project that firmly demonstrates Canada's sovereignty in the Arctic.*

*Status: The project is currently in the environmental assessment phase with an expected release date of Q1 2013. Baffinland is currently completing its feasibility study and in Q4 of 2011 will seek board sanction to undertake the full project. Baffinland has also applied under the applicable legislation to do pre-development work involving the marshalling of materiel in Nunavut in 2012, during the narrow sea lift window, so as to be able to start construction immediately after project release in early 2013.*

*At the end of the presentation, Robert Carson offered to try and answer questions about the Mary River project (although he no longer on behalf of the Government of Nunavut, as he no longer works for them as of September 2011). He mentioned that it was a significant mining project on Inuit lands, and that a part of the royalties would go to the Inuit communities in the region.*





## RODION SULYANDZIGA

*BOARD CHAIR OF THE INDIGENOUS PEOPLES' SECRETARIAT OF THE ARCTIC COUNCIL;  
DIRECTOR OF THE CENTER FOR SUPPORT OF INDIGENOUS PEOPLES OF THE NORTH*

### INDIGENOUS PEOPLES' PROSPECTS IN THE ARCTIC

Dr. Sulyandziga opened his talk by presenting the Russian Association of Indigenous Peoples of the North, Siberia and Far East (RAIPON) <http://raipon.info>. RAIPON is an umbrella organisation of 40 indigenous groups of the Russian Federation.

He focused on the growing interest in the Arctic, in light of the changes in the Arctic opening up access to natural resources and tourism.

"What is the Arctic?" he asked, highlighting possible views from different stakeholders:

- A source of natural resources.
- Periphery or geopolitical arena.
- Conservation and the creation of protected areas.
- A home for Northern peoples.
- A territory of Dialogue.
- An international regime vs. states' sovereignty.

He pointed out the publication of Arctic strategies as a new trend, citing the Finnish, Norwegian, EU, Danish, Canadian, American and Russian strategies.

The political prospects for the indigenous peoples of the Arctic include promoting the Arctic Council, as it is a good example for the rest of the world, and is currently moving from merely a policy-shaping body to more of a policy-making body. He also promoted using international law instruments such as the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP), sustainable development principles, and working within a UN framework such as the United Nations Permanent Forum on Indigenous Issues and the Expert Mechanism on the Rights of Indigenous Peoples (EMRIP). Development must involve international cooperation and indigenous peoples in the process, as well as a multi-level governance scheme to ensure the Arctic is developed sustainably.

Turning to the issue of perceptions of indigenous peoples and economic development, Dr. Sulyandziga said that the issue of self-determination is often misunderstood. There is a false stereotype that indigenous peoples are opposed to development. In reality, indigenous peoples generally believe in sustainable exploitation of natural resources rather than blind conservation of the Arctic. He mentioned that development projects on traditionally indigenous lands should involve sharing benefits of the development with the local indigenous inhabitants while respecting local traditions and cultures.

As for the cultural prospects of the indigenous peoples of Russia, there are about eight indigenous groups who have populations between 1,000 and 2,000 individuals. Many of these peoples face assimilation and the disappearance of their language and culture. There needs to be youth commitment programmes. Special attention must be paid to Russian indigenous peoples due to their small and dwindling numbers.

Dr. Sulyandziga then considered whether the Arctic is ready for co-management. The answer is not obvious. All stakeholders, including civil society, regional governments, indigenous peoples and the private sector need to sit around the negotiation table.

From the side of the federal government in Russia, Dr. Sulyandziga argued there should be:

- Increased recognition of indigenous rights.
- Adequate mechanisms to enforce legislation to protect these rights.
- Solid policies aimed at achieving sustainable development of the North and its indigenous residents.
- Adequate resources to implement government policies.
- Adequate capacity within the civil service to deal with indigenous issues, as it is crucial to keep good relations and understanding with indigenous peoples.

He said the private sector should ask themselves the following questions:

- Are indigenous concerns a priority?
- Is there a long-term strategy that includes indigenous peoples?
- Is there increased pressure for corporate responsibility?
- Is there a willingness to explore more stable ways of dealing with indigenous peoples?

In the end, indigenous peoples want their rights, interests and concerns to be respected, he stressed. They don't simply want money for the resources on their land.

To underscore his arguments, Dr. Sulyandziga showed a map indicating 70 different places where local indigenous peoples and the Russian government are in conflict over issues such as dam construction, mining, forestry, and oil and gas pipeline construction.

Aboriginal movements may have different approaches and strategies, but they must all ask themselves:

- Are their existing rights being upheld?
- Do they have the capacity to deal with legislative matters?
- Do they have an economic development strategy? Is it uniform?
- Do they have the will and ability to benefit from a market economy?
- Do they have sufficient funding to communicate their concerns?

Civil society must ask itself:

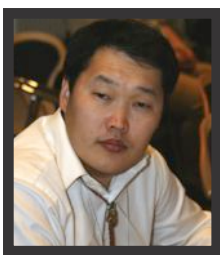
- Does it have adequate institutional strength?
- Does it have tolerant understanding of aboriginal aspirations and concerns?
- Does it have good will toward aboriginal gains?
- Does it have balanced views on northern development?

As Russia is very big, it is very multi-cultural. There can be some very large regional differences. It is important for these differences to be respected and for the rights of the different groups to be observed. Co-management is an important tool in working together. He cited enhanced legislation, having an aboriginal strategy, education and outreach initiatives, capacity building on a local scale, maintaining a dialogue with

federal and regional authorities as well as the private sector and civil society, and fundraising.

On the role of science, Dr. Sulyandziga stressed the need for more knowledge about the Arctic, especially more knowledge of the human dimensions of the Arctic and human development in this region. He said that sometimes only partial knowledge is worse than no knowledge at all, as it can often lead to bad decision-making.

His talk ended by noting that there is no plural for the word “future” in Russian. He used this to demonstrate that there is only one future for all peoples together.



## MIKHAIL POGODAEV

*EXECUTIVE CHAIR OF THE ASSOCIATION OF WORLD REINDEER HERDERS*

### CHALLENGES FACING INDIGENOUS NOMADIC COMMUNITIES IN A DEVELOPING ARCTIC

At the start of his presentation, Dr. Pogodaev gave some facts and figures on reindeer husbandry to emphasize the scope of reindeer herding in the Arctic: 2.5 million reindeer are herded on about 4 million km<sup>2</sup> of pasture. The practice is circumpolar from Scandinavia to Alaska through Russia and Mongolia, and it has strong element of cultural identity, as herding is a choice to live in a certain way.

The main challenges affecting the sustainability of circumpolar herding communities are climate change, globalisation and land use change.

Dr. Pogodaev mentioned he participated in an IPY and Arctic Council research project called the EALĀT project (its final report was delivered during the Nuuk Ministerial meeting in May 2011).

Global and regional scenarios project dramatic changes in temperature, precipitation and snow conditions in key areas for reindeer herding, and social-economic changes for reindeer herding communities in the Arctic.

Comparing annual and seasonal mean temperature observed over 1961-1990 in Finmark, Norway and possible scenarios for 2071-2100 on a graph, Dr. Pogodaev showed that temperatures in the summer may increase by 2-4°C on average over this time period while temperatures in winter may increase by 7-8°C. Summers will become drier, which will make taiga fires more likely. He then showed similar scenarios for other locations in the Arctic.

Globalisation and land use change is a major challenge for reindeer herders. As the Arctic becomes more accessible, economic opportunities are opening up. The Yamal gas fields are the main region of gas extraction in Russia, and the main destination for the gas is European markets. Migration routes for reindeer herders are blocked by roads and pipelines, and the pasture land can become degraded. Yet he said that recently in Yamal the local government and the gas companies are starting to understand the issues. Another example of land degradation is the gold mining area in Southern Yakutia. He said this loss of pasture lands is even worse for Sweden than for Russia.

Social and economic changes are also a challenge to reindeer herding communities, said Dr. Pogodaev. In the Neryungri Region, the average wages one gets working in the coal industry are ten times what state farms can pay reindeer herders. Many

young reindeer herders move to cities to try to find work, but face issues such as unemployment, alcoholism and suicide.

One solution is privatising reindeer husbandry and its value chain. When the Communists were in power in Russia, no herders owned their own reindeer; they could only go to a state-owned farm to herd. Not much has changed. Many don't know what it is to own reindeer. Herders have no possibility to create their own market or have an influence over prices; they merely deliver meat to the big monopolies. On top of this, there is no market access. Reindeer herders can buy beef from Argentina, but not reindeer meat from their own communities in Russia. He encouraged local engagement to educate reindeer herders so they can understand the changes taking place.

He then touched upon some of the key findings<sup>13</sup> from the Arctic Council's SDWG EALÁT project (the remainder can be found in his presentation on the IPF website):

- Climate and socio-economic change are now evident across the Arctic, and is particularly evident in reindeer herding cultures and in their traditional areas.
- Global and regional scenarios project dramatic changes in temperature, precipitation and snow conditions in the key areas for reindeer herding as well as socio-economic changes for reindeer herding communities and other indigenous communities in the Arctic.
- Degradation of pasture lands combined with the consequences of a changing climate will challenge the future of reindeer husbandry.

National policies should support traditional cultures and education, Dr. Pogodaev argued, as there is an urgent need to educate herders and industrial leaders about ongoing changes in the Arctic. The protection of grazing lands is the main issue indigenous reindeer herders face.

He brought to everyone's attention the Arctic Council's commitment to indigenous peoples' participation and its recognition of the significance of reindeer herding in the Arctic. He mentioned in particular the 2009 Tromsø Declaration, the 2011 Nuuk Declaration and a declaration at the 9<sup>th</sup> Conference of Parliamentarians of the Arctic Region in 2010.

Dr. Pogodaev also mentioned the University of the Arctic's EALÁT Institute [www.ealat.org](http://www.ealat.org), which opened in Kautokeino, Norway in March 2011, saying it is an excellent tool to help young reindeer herders continue the practices of their ancestors and maintain networks. He thanked HSH Prince Albert II for supporting the students at the school. He also brought up the Arctic Lavvo Dialogue, which took place at the 2012 Arctic Frontiers Conference [www.arcticfrontiers.com](http://www.arcticfrontiers.com) in Tromsø, Norway. The dialogue included scientists, politicians, industry representatives and reindeer herding youth who met to discuss energy and industrial development in the Arctic and the involvement of indigenous peoples in this process.

All discussions should start from the human dimension, said Dr. Pogodaev. The main issue is capacity-building and fostering knowledge in local communities. Having herding skills is not enough anymore because the mainstream society is making its way into indigenous societies, and indigenous peoples must be able to deal with it. Reindeer herding can be a profitable enterprise under the right conditions.

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<sup>13</sup> Taken from: [http://icr.arcticportal.org/index.php?option=com\\_content&view=article&id=1886:ealat-delivers-to-arctic-council-ministerial-in-nuuk&catid=108:news-latest&Itemid=4&lang=sa](http://icr.arcticportal.org/index.php?option=com_content&view=article&id=1886:ealat-delivers-to-arctic-council-ministerial-in-nuuk&catid=108:news-latest&Itemid=4&lang=sa)

In his conclusion, Dr. Pogodaev stressed that indigenous peoples would like to develop their own future. He said herders are ready to cooperate, but asked whether mainstream society is. He invited participants to consult the Reindeer Portal [www.reindeerportal.org](http://www.reindeerportal.org) for additional information.

## DISCUSSION

Erik Gant from the Arctic Council Indigenous Peoples' Secretariat asked about the interplay of human rights and business when it comes to natural resource extraction.

Dr. Sulyandziga responded that getting involved in human rights advocacy is critical. The UN Human Rights Council has developed a special working group and advocacy activities concerning this issue.

Dr. Pogodaev said it was a difficult question. He said the extraction of resources was not always linked to human rights, but rather to the protection of territories. The question is not whether or not to develop, but rather how to develop. The world is hungry for resources, and at some point human rights will enter into the picture. There are instances where development in the Arctic doesn't benefit the local communities. It is important to look at drivers and how development can benefit local communities.

IPF Vice-President Nighat Amin asked what proportion of the reindeer herding population is nomadic and how one can help nomadic herding populations with education and provide medical care. She mentioned that children of reindeer herders are often taken away from their nomadic families and sent to boarding schools. In certain areas, authorities say the children of reindeer herders must have an education. The children don't grow up in the herding community and miss day-to-day life with their herding families.

Dr. Pogodaev replied that more than 50% of reindeer are privately owned in Yamal, while in other areas it can be as low as 10%. The remainder are still collectively owned by the state. Management is not effective, and there are no regulations. In Scandinavia, there is 100% private reindeer ownership. Everyone has an earmark for his or her reindeer to prove ownership. There are also big differences from region to region in Russia. The Reindeer Herders Association has asked many times for federal regulatory legislation on this matter in Russia, but it has had no response thus far.

Regarding social services such as education and medical care, Dr. Pogodaev said there are millions of square kilometres of territory to cover, so it's not easy to deliver these services. They are trying ideas such as nomadic schools as well as new technologies to provide remote areas with social services such as education and medical care.

Prof. Kankaanpää added that collection of information about how social services are administered is difficult due to the large distances one needs to travel.

Eric Turner from AECOM asked if the degradation of permafrost will have a positive or negative effect on reindeer herders.

Dr. Pogodaev responded that right now it's not a big problem, but over time it may start to change the landscape and it could have an impact.

Dr. Gerlis Fugman from APECS wanted to know where indigenous peoples need to draw a line with regards to resource development.

Dr. Sulyandziga replied that there needs to be a balance. For bigger indigenous groups such as the Inuit in Greenland and Canada, it is easier to negotiate and decide. But for smaller Russian indigenous groups, this is more difficult. The best approach is to take things step by step and develop one's own evolution.

Dr. Rósa Rut Þórisdóttir from APECS asked about the Mary River Mining Project. As a social scientist, she said while the project looks good on paper, there is often a gap between theory and practice. She wondered if the project was really working.

Mr. Carson replied that ownership has changed in the last two years. The local Inuit Association has made an agreement with the Baffinland Company. There has been an Environmental Impact Assessment and this includes impacts on the Inuit. An Inuit impact and benefit agreement has been signed and this is linked to the Nunavut Land Claims Agreement. Baffinland have hired 10% of their workforce locally. This percentage will grow when construction starts on the railroad and extraction begins.

Zuzanna Bieniuk from the European Commission asked about the bridge between the academic world and indigenous society and if there was enough support. She also asked Prof. Kankaanpää how the project she presented involves indigenous peoples.

In response to Ms. Bieniuk's first question, Mr. Carson quoted an Inuit saying: "We know when it's spring because the birds and researchers all come north. In fall, we are sad to see the birds go."

Prof. Kankaanpää replied that there is an EU-funded project to investigate how reindeer herders' knowledge has been taken into account by decision makers in Finland. That project was planned very closely with the reindeer herders. The results have been discussed with the reindeer herders. There is a similar project in which scientists and reindeer herders have worked together in the Yamal area.

There is still a lot still to be done, she said, and the normal academic process is too slow – the time for writing up research, approval by professors and then publication.

Dr. Pogodaev agreed with Prof. Kankaanpää that good cooperation with scientific institutions is important. He was disappointed that sometimes in scientific circles, traditional knowledge is not considered to be very valuable. He said there needs to be youth engagement to combine local and scientific knowledge.

Dr. Sulyandziga added that sometimes scientists work at two levels, serving the fundamental scientific community while also serving business and government. He argued that scientists should ensure that every project includes a budget for capacity-building.

Prof. Gascard from the Université Pierre et Marie Curie in Paris wondered if there were any concerns about potential climate refugees in the Arctic.

Prof. Kankaanpää answered that economic development in the Arctic is the main issue. Climate change is more of a global issue. In the Arctic, there are local discussions on adaptation to the changing climate.

Dr. Pogodaev added that he hopes there will not be any climate refugees. It would be a difficult issue to deal with, and it would need to be dealt with on a case-by-case basis.



## H.E. MICHEL ROCARD

*FRENCH AMBASSADOR TO THE POLAR REGIONS; FORMER PRIME MINISTER OF FRANCE*

### CLOSING KEYNOTE SPEECH

A warmer Arctic is a more accessible Arctic, Ambassador Rocard said. However the story of the Arctic is enormous. For millennia, the Arctic was difficult to access. Amundsen flew over the Arctic before actually reaching it on foot. Now it is possible to reach the Arctic much more easily, for tourism, fishing, trade and transport.

The Arctic is like a second Middle East, Ambassador Rocard said, with 30% of the world's undiscovered natural gas reserves and 13% of the world's undiscovered oil reserves.

A catastrophe for the rest of the world – global warming – is the beginning for the Arctic. It's opening a new page of national sovereignty: Russia has many opportunities for transport, navigation and trade. Greenland is seeking independence and has vast resources to export. Norway is an experienced, expert and powerful country in the Arctic, showing talent and responsibility. Canada has rediscovered the Arctic, and the Arctic is the new face of national history and identity for Canada.

Regarding military force and presence in the Arctic, things are not so simple. Ambassador Rocard cited the example of Costa Rica, where the constitution forbids armed forces. There has never been a coup d'état in Costa Rica and its President Oscar Arias won the Nobel Peace Prize in the 1980s. In contrast, the three surrounding countries, which all have standing armies, have experienced civil wars.

He then defined sovereignty as the ability to behave freely without influence from anyone apart from international organisations. Ambassador Rocard defined independence as the freedom to negotiate interdependences. These principles should be kept in mind for the Arctic, too, he said.

The Ambassador then addressed the problems the Arctic is facing.

Indigenous people feel their way of life is threatened. He said that he shared their worries.

Tourism can encourage people to become ambassadors and enthusiasts of the Arctic, but it can create pollution. He argued there needs to be rules for managing the environment and for safety.

The summer Arctic sea ice cover continues to decline, with 2011 another record year for sea ice melt not far behind 2007. This indicates that we are likely to witness sea ice-free summers in the Arctic by 2030 as many researchers are predicting.

About 50% of the fish Europeans eat comes from the Arctic, and we need to know which species need to be conserved and which should be fished. We need to look to science to provide more information. No diplomatic work has begun on this front, and the Arctic Council is not talking about fishing, he said.

Moving on to oil and gas development, Ambassador Rocard used the Gulf of Mexico oil spill to illustrate the fact that while the techniques used to break down oil in the Gulf of Mexico can be used in warmer waters, they are usually not as effective in the colder waters of the Arctic. Considering the environmental consequences of a massive oil spill in the Arctic is a frightening thought.

On the issue of transportation, he mentioned the Arctic maritime routes could be an alternative for ships that are too big to use the Panama Canal. Trade between Europe and Japan, China, and the West Coast of the US represents about 50% of all world trade. There will be a fantastic demand for navigation in the North, and the pressure will be enormous.

In 2010, three accidents occurred in the Canadian Arctic due to errors in the maps the navigators used. In the Western Arctic, there are also no lighthouses, no buoys, no observer aircraft, no harbours, and few rescue helicopters, which only have a limited range.

Arctic States say such things are national affairs. However Ambassador Rocard pointed out that none of the Arctic States can finance mapping or installing infrastructure in the Arctic alone. It is too expensive. Because of its interest in using the Arctic as



a shipping route one day, China is offering to help with the preparations for making the Arctic more navigable for ships. The Ambassador mentioned the idea of creating a worldwide company similar to the Suez Company that could work on making the Arctic Ocean more navigable. He said no one was talking about such a solution.

There also must be certain safety regulations in place before industries arrive en masse in the Arctic. Fishing companies could arrive before a legal framework for the Arctic is in place. Maximum protection of the environment is needed. It would be “unwise” not to have a legal framework.

Sovereign waters are not covered by sovereignty, but only by sovereign rights. According to the UN Convention on the Law of the Sea, the Arctic Ocean is part of international waters. According to the convention, a state’s territorial seas, which extend only 12 nautical miles from its coast, are the only exception.

The current situation in the Arctic is not a satisfactory situation, said the Ambassador. International diplomacy doesn’t often succeed. Most Arctic States fear for their sovereignty, but there is no need for this worry. There needs to be discussion between all stakeholders.

On the subject of the Arctic Council and the EU becoming an observer, he said the EU has a lot to offer the Arctic. Excluding the EU from the Arctic Council as an observer was a mistake.

Ambassador Rocard ended with the idea that the way in which Antarctica is managed through the Antarctic Treaty System might be a good precedent for managing the Arctic. The Ambassador stated that Antarctica has been “saved” by a treaty that has demilitarized it, and argued that a similar treaty might be useful for the Arctic.



## NIGHAT AMIN

*VICE-PRESIDENT OF THE INTERNATIONAL POLAR FOUNDATION*

### CONFERENCE WRAP-UP

IPF Vice-President Nighat Amin thanked everyone who had put so much effort into making the Arctic Futures Symposium 2011 a success. In particular she thanked the speakers and moderators who took time out of their busy schedules and, in some cases, travel quite far to share their expertise with everyone; she thanked the IPF staff who spent a great deal of time and effort organising the event; and she thanked everyone who attended the symposium and made valuable contributions to the discussions. She was happy that everyone was able to hear the latest developments on the political, scientific, sociological and resource development front, and that speakers and participants alike were able to share their knowledge and participate in dialogue.

Ms. Amin mentioned the need for finding “21st century solutions” for the “21st century problems” the Arctic is facing, and underscored the importance of informing and involving all relevant Arctic stakeholders in the dialogue as agreements, frameworks and regulations are put in place. Peoples’ rights must be protected, she stressed. The environment must also be protected, and monitoring programmes should continue to help make sure it is protected.

Regarding the Search and Rescue Agreement signed in Nuuk, Ms. Amin pointed out that while the binding agreement was an important step, Arctic Council Member States currently have neither the capacity nor the infrastructure to carry out extensive

search and rescue operations, and she thanked the speakers and moderators who addressed this point.

Ms. Amin showed great enthusiasm for the EU Arctic Information Centre initiative that Prof. Paula Kankaanpää and her colleagues at the University of Lapland have been working hard to establish. Providing information is a way to empower all Arctic stakeholders, she said, offering 100% of her support to the initiative.

In conclusion, Ms. Amin thanked everyone again for sharing their knowledge and personal experiences, stating that “the dialogue and the cooperation [in the Arctic] that will come is through the sharing of our common stories.”

She wished everyone the best and hoped to see them at the next Arctic Futures Symposium, scheduled to take place in Brussels on 4-5 October, 2012.

# MAIN POINTS FROM ARCTIC FUTURES SYMPOSIUM 2011:

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- Cooperation is high amongst Arctic States. The search and rescue agreement signed at the Nuuk Ministerial is evidence of this. Cooperation is the only way forward in addressing issues that face all Arctic stakeholders.
- The Arctic States want to work within existing legal frameworks (such as the United Nations Convention on the Law of the Sea) and with regional and bilateral partners in areas where it makes sense. The consensus amongst Arctic States is that no additional treaties or legal frameworks are necessary for Arctic governance.
- The Arctic Council continues to be considered the pre-eminent international forum for addressing Arctic issues. The Swedes, who are currently chairing the body, see an eventual shift in the Arctic Council from a decision-shaping forum to a decision-making body.
- The Arctic Council is a unique institution that works in a unique region of the world. Using it as a model of governance for other regions of the world is not realistic. A treaty system similar to what is used to govern the Antarctic would not be suitable, as the Arctic is made up of sovereign states that have been inhabited for millennia.
- Arguments in favour of the EU obtaining permanent observer status on the Arctic Council: The EU has territory in the Arctic via its member states (SE, FI, DK) and is the largest consumer of Arctic resources; what happens in the EU (pollution) affects the Arctic and what happens in the Arctic (climate change) affects the EU.
- Development of Arctic resources is inevitable; however it should take place under the strictest environmental standards and respect indigenous peoples' rights and concerns.
- As it is their traditional homeland and where they make their livelihood, indigenous peoples of the Arctic wish to be a part of the dialogue when it comes to developing resources on their lands and in their waters (where this is not already the case).
- Those who live in the Arctic have the right to determine how they should develop their natural resources.
- Safeguarding the Arctic environment does not mean preserving the Arctic and leaving it untouched. Economic development in the Arctic and safeguarding the environment are both possible if development of resources is done in a sustainable way.
- Armed conflict over natural resources in the Arctic is highly unlikely. Legal mechanisms exist for resolving conflicts peacefully.
- Arctic shipping is unlikely to explode in the coming years, although legal frameworks and regulations should be put in place to anticipate an increase in marine traffic.
- Even though an agreement has been signed on search and rescue (SAR), means to conduct search and rescue operations in the Arctic are severely inadequate.

Current maritime transport infrastructure cannot meet the needs of current or future Arctic shipping traffic. Infrastructure must be improved.

- Existing bridges between politicians, indigenous peoples, scientists, industries and civil society should be developed and enhanced. Co-management and cooperation strategies should be developed between stakeholders where it makes sense. There needs to be willingness on the part of all stakeholders to bridge existing gaps.
- It is important to continue and support research in the Arctic across a wide range of disciplines, as it will provide policymakers with a sound basis to make decisions. It is particularly important to fund long-term observation campaigns, as this makes it possible to identify clear trends.
- Observing the Arctic via satellite as well as with in-situ ice stations and buoys is key for collecting data to better understand the Arctic, its climate, and how its climate is changing. This data can also be put to practical use through sea ice monitoring, which can assist in maritime transport and search and rescue operations, as well as pollution monitoring.
- Information on the environment (air quality, water quality, etc.) should be made free and easily accessible to all.

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