

# Northern Climate ExChange

*Independent Information - Shared Understanding - Action on Climate Change*

NCE Update April 28, 2010

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## Announcements

### **1. TODAY: Pacific Climate Seminar Series: An Outside-the-Box Approach to Climate Change Negotiations**

**What:** Pacific Climate Seminar Series: An Outside-the-Box Approach to Climate Change Negotiations

**When:** Wednesday, April 28 - 3.30 to 4.30 p.m.

**Where:** Social Sciences and Mathematics Bldg. Room A120

**Presented by:** Barry Carin, Associate Director, Centre for Global Studies, University of Victoria and Senior Fellow, Centre for International Governance Innovation.

Seminar will be available via live webcast at:

<http://www.pics.uvic.ca/broadcast.php>. Slides will be available online just before the seminar.

[More information.](#)

[www.pics.uvic.ca](http://www.pics.uvic.ca)

### **2. Northern Bioenergy Conference in Whitehorse, Yukon**

**The Northern Bioenergy Conference will take place in Whitehorse, Yukon on May 26 & 27, 2010.**



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"This is the first bioenergy conference with a focus on Northern opportunities and potentials. The purpose of this two day conference is to provide Northern residents with relevant information on bioenergy, and to look at what territorial governments are doing to support a bioeconomy.

The basics of an emerging northern bioeconomy will be covered in the first part of the workshop followed by a more detailed examination of bioenergy opportunities and potential solutions for the North, as well as review government's strategy and policy.

This conference will benefit First Nations, industry, government, and communities looking for alternative energy sources.

[www.northernbioenergyconference.ca](http://www.northernbioenergyconference.ca)

### **3. New EPA Report: Climate Change Indicators in the United States**

"Collecting and interpreting environmental indicators play a critical role in our understanding of climate change and its causes. An indicator represents the state of certain environmental conditions over a given area and a specified period of time. Examples of climate change indicators include temperature, precipitation, sea level, and greenhouse gas concentrations in the atmosphere.

EPA's [Climate Change Indicators in the United States](#) (PDF) (80 pp, 13.2MB) report will help readers interpret a set of important indicators to better understand climate change.

The report presents 24 indicators, each describing trends related to the causes and effects of climate change. It focuses primarily on the United States, but in some cases global trends are presented to provide context or a basis for comparison."

[www.epa.gov](http://www.epa.gov)

## **Articles**

### **1. Some scientists think receding sea ice could lead to species mingling**

By Jeff Richardson  
Daily News-Miner  
April 25, 2010

As long-term climate models predict declining amounts of sea ice in the Arctic, a University of Alaska Fairbanks researcher believes the change could bring an unexpected result - more inter-species breeding among mammals that live in the far north.

Brendan Kelly, a marine biology professor at UAF's International Arctic Research Center, said the presence of sea ice has resulted in the isolation of numerous animals in the Arctic during the past 10,000 years or more. Those animals have evolved gradually into distinct species, such as walruses, ringed seals and polar bears.

But without ice to separate them in the future, Kelly believes many of those distant cousins will start to

mingle again. The result could be more breeding between species, resulting in a biological stew that could reshape animal life in the Arctic.

"In 100 years, the species (in the Arctic) will be different than the species today," Kelly said. "Is that good; is that bad? It's different, for sure."

Kelly discussed the theory during a teleconference hosted by the Alaska Center for Climate Assessment and Policy on Tuesday and has submitted a manuscript on the subject to *Global Change Biology*, a peer-reviewed science journal.

Kelly said there's an understandable public weariness toward scientists who attribute every blip in the ecosystem to global warming but said he's confident the theory is sound.

He said there are at least 28 mammal species that are likely candidates to interbreed. Among several of them, there's already evidence it is happening.

In the past decade, a number of discoveries have been made in the north that appear to be offspring from two different species. They include an animal that looks like a blend of a harp seal and hooded seal, a ribbon seal-spotted seal hybrid, and a whale that resembles both a beluga and narwhal.

The phenomena also has been seen on land, where at least two grizzly-polar bear mixes have been found.

"This is probably going on more than we think. We just don't see it," Kelly said.

Although it seems unlikely that distinct species could create offspring together, Kelly said species classification is often subjective. There often isn't a bright line between differing species, and some significantly different animals can mate and reproduce.

"This really kind of pushes our definition of species," he said. "It kind of shows our dirty underwear as biologists."

UAF Marine Biology Professor Mike Castellini agrees the likelihood of mixed-species breeding is growing in the far north. He said many uncertainties remain, but they're underscored by a simple fact - Arctic animals are coming into contact with each other more than at any other time in the past 10,000 years.

"There are clearly more opportunities for these species to interact with each other on a number of levels," he said.

The coverage area of summer sea ice in the Arctic has actually increased slightly in each of the last few years, although it remains about 25 percent below the 30-year average for the area, according to the National Oceanic and Atmospheric Administration. NOAA projects that the Arctic could be ice-free in the summer within 30 years.

Unfortunately, Kelly said the inter-species breeding probably won't result in an evolutionary adaptation to the changing conditions.

Although gradual evolution is thought to be a key to long-term animal survival, Kelly said the rapid change in sea ice probably won't give Arctic mammals enough time to adjust. He said the unfortunate result is likely to be a spike in extinction rates.

"It's a lot closer to a meteor strike than to the evolution of green plants," he said.

[www.newsminer.com](http://www.newsminer.com)

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## **2. Yukon's shrinking glaciers: little numbers, big impact**

By James Munson

Yukon News  
April 23, 2010

The Yukon has some of the fastest-melting glaciers in the world, according to the first measurements of the territory's impact on rising sea-levels.

But you might be surprised by the consequences. Yukon glaciers have raised global sea levels by one millimetre over the last 50 years.

Not impressed? You should be.

Though the number seems deceptively puny, consider this: if you took all the meltwater from the Yukon's glaciers in the last 50 years and stretched it over the entire surface area of all the world's oceans, you'll have added one millimetre.

That's a lot of melted ice.

In fact, it's 406 cubic kilometres of ice down the drain in just half a century. Put another way, 22 per cent of the Yukon's glaciers have vanished.

Tucked away in the remote St. Elias and Mackenzie Mountains, the Yukon's glaciers have fallen off the scientific radar for years.

But now the first research ever on the Yukon's impact on rising sea levels has been published by two geophysicists from the University of Alberta.

And we're definitely punching above our weight.

"As a regional number, it's quite a large one," said Dr. Nick Barrand, a researcher at the University of Alberta who recently completed his study glaciers with colleague Dr. Martin Sharp. "And it's a regional thinning rate that is greater than almost all other glacier and ice-cap regions."

Outside of the Antarctic and Greenland ice sheets, a long list of smaller regions with glaciers and ice caps also contribute to the rise of sea levels currently underway.

Of those regions, only Alaskan and Patagonian glaciers are melting faster than the Yukon.

"It certainly will have local effects in terms of water supply to downstream regions," said Barrand. "But the main focus of our work is the global picture."

Barrand and Sharp didn't do any fieldwork to figure out how fast the glaciers are shrinking.

They used an extensive archive of aerial photographs taken in 1957 and 1958 by the Canadian Land Survey. Covering every inch of the Yukon, they examined the photos of the territory's glaciers and extrapolated their volume and size based on glacier formations around the world.

Then they compared the volumes with satellite photos from Landsat, a NASA-sponsored satellite that offers images of the Earth from space. Those pictures were taken in 2006 and 2008.

After comparing the two photo sets, the researchers had the first glimpse ever on how quickly the Yukon's glaciers are disappearing.

"I'd say (Yukon glaciers) are very much understudied," said Barrand. "One of the main reasons being that they're so remote."

"Almost no work at all has been done in the Yukon previously to this," he said.

There has been some earlier work done by the University of Alaska, he said. But it only measured a few of the Yukon's glaciers and grouped them within a larger Alaskan-based region.

There are around 10,000 square kilometres of glacial ice in the Yukon. Most of it is in the St. Elias Mountains, but glaciers also lie in the nooks and crannies of the Mackenzie Mountains.

"The Kluane glaciers receive a lot of snowfall," said Barrand. "They're by the coast, so the precipitation is high and they tend to be bigger generally."

"The Mackenzie Mountains ones are smaller - they're what we call cirque glaciers," he said. "They sit within very deep, shaded mountain halls, so they don't receive a great deal of precipitation."

"But because of their location, that's how they're able to remain there year-round."

Barrand is originally from Leeds, England. He became fascinated by glaciers from courses he took as an undergrad in Newcastle, and pursued his interest with a doctorate degree from the University of Swansea.

"I'd visited them on holidays and I thought they were beautiful places," he said. "I was interested in the way their melting affects global sea levels."

"It's a really important scientific and intellectual question."

Now he will contribute to the global effort of determining what the impacts of melting sea ice will be.

The United Nations' Intergovernmental Panel on Climate Change is currently gathering new data for its next meeting in Mexico next November. Authors are currently filing through new research and citing it in more overarching studies.

"Hopefully, it will be included in their next assessment," said Barrand.

[yukon-news.com](http://yukon-news.com)

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### **3. B.C. climatologist sues National Post**

*Skeptics and believers in climate change could battle in civil court*

CBC News  
April 22, 2010

A prominent University of Victoria climate researcher says he's been repeatedly defamed by the National Post and has launched a lawsuit against the national newspaper.

Andrew Weaver has filed a statement of claim in B.C. Supreme Court, citing four articles published in the newspaper late 2009 and early 2010.

"These articles put him in a false light," said Weaver's lawyer, Roger McConchie. "Attributing to [Weaver] views that he says he never held and accusing him of conduct that he says never occurred."

Weaver, a full professor who was part of the Intergovernmental Panel on Climate Change that won the Nobel Prize in 2007, claims in the court documents that the National Post articles suggest he's a corrupt scientist who promotes global warming theories so he can obtain government research grants.

### **War of words**

Vancouver public relations entrepreneur James Hoggan is the author of a book that examines the war of words between scientists and climate change skeptics.

He also recently filed a lawsuit against the newspaper and told CBC News he's not surprised the debate over climate change is ending up in court.

"We've documented over the past two decades almost a crusade against climate science," Hoggan said.

"When people have that kind of passionate belief - or disbelief in this case - in something, they tend to step over the line."

The newspaper articles about Weaver still circulate on the internet, and as part of his lawsuit, Weaver is asking the court to have the National Post remove the articles from its own website and from any other site where they can be found.

"He's only bringing this action because he sees this and the law as the only mechanism that will allow him to correct the very public worldwide record," McConchie said.

The National Post could not be reached for comment and has not filed a statement of defence against Weaver's allegations.

*With files from the CBC's Ben Hadaway and Belle Puri.*

[www.cbc.ca](http://www.cbc.ca)

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## 4. Ancient Artifacts Revealed as Northern Ice Patches Melt

ScienceDaily  
April 26, 2010

High in the Mackenzie Mountains, scientists are finding a treasure trove of ancient hunting tools being revealed as warming temperatures melt patches of ice that have been in place for thousands of years.

Tom Andrews, an archaeologist with the Prince of Wales Northern Heritage Centre in Yellowknife and lead researcher on the International Polar Year Ice Patch Study, is amazed at the implements being discovered by researchers.

"We're just like children opening Christmas presents. I kind of pinch myself," says Andrews.

Ice patches are accumulations of annual snow that, until recently, remained frozen all year. For millennia, caribou seeking relief from summer heat and insects have made their way to ice patches where they bed down until cooler temperatures prevail. Hunters noticed caribou were, in effect, marooned on these ice islands and took advantage.

"I'm never surprised at the brilliance of ancient hunters anymore. I feel stupid that we didn't find this sooner," says Andrews.

Ice patch archeology is a recent phenomenon that began in Yukon. In 1997, sheep hunters discovered a 4,300-year-old dart shaft in caribou dung that had become exposed as the ice receded. Scientists who investigated the site found layers of caribou dung buried between annual deposits of ice. They also discovered a repository of well-preserved artifacts.

Andrews first became aware of the importance of ice patches when word about the Yukon find started leaking out. "We began wondering if we had the same phenomenon here."

In 2000, he cobbled together funds to buy satellite imagery of specific areas in the Mackenzie Mountains and began to examine ice patches in the region. Five years later, he had raised enough to support a four-hour helicopter ride to investigate two ice patches. The trip proved fruitful.

"Low and behold, we found a willow bow." That discovery led to a successful application for federal International Polar Year funds which have allowed an interdisciplinary team of researchers to explore eight ice patches for four years.

The results have been extraordinary. Andrews and his team have found 2400-year-old spear throwing tools, a 1000-year-old ground squirrel snare, and bows and arrows dating back 850 years. Biologists involved in

the project are examining dung for plant remains, insect parts, pollen and caribou parasites. Others are studying DNA evidence to track the lineage and migration patterns of caribou. Andrews also works closely with the Shutaot'ine or Mountain Dene, drawing on their guiding experience and traditional knowledge.

"The implements are truly amazing. There are wooden arrows and dart shafts so fine you can't believe someone sat down with a stone and made them."

Andrews is currently in a race against time. His IPY funds have run out and he is keenly aware that each summer, the patches continue to melt. In fact, two of the eight original patches have already disappeared.

"We realize that the ice patches are continuing to melt and we have an ethical obligation to collect these artifacts as they are exposed," says Andrews. If left on the ground, exposed artifacts would be trampled by caribou or dissolved by the acidic soils. "In a year or two the artifacts would be gone."

[www.sciencedaily.com](http://www.sciencedaily.com)

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## **5. Warmer Arctic creates nasty surprises for the early birds**

*Migrating birds sometimes find no food, mismatched environment*

By Jane George  
Nunatsiaq Online  
April 25, 2010

As Arctic temperatures warm and weather becomes less predictable, migratory birds may face new challenges and some nasty surprises when they return north, researchers with the Canadian Wildlife Service say.

Sometimes birds arrive at their northern breeding grounds earlier than they used to, driven by warm weather in the South, only to find no food there when they arrive.

And, once they're in the Arctic, increasingly unpredictable weather can cause them another lot of misery.

Due to higher than average temperatures in many parts of Nunavut this past winter, birds are already flocking back to the High Arctic.

In Cambridge Bay, where Environment Canada says temperatures were five to six degrees above normal this past winter, and warm again into March and April, snow buntings have returned - a full month earlier than usual.

This means Canada geese, snow geese and other migratory birds aren't far behind, hunters say.

But when the birds finally arrive at their destination, their entire breeding cycle could be turned upside down.

That's because the breeding schedules of these birds may be out of whack with nature and as a result they may lack food for their young.

The birds' arrival may not follow the same pace of change as the environment, producing what wildlife biologists called a "mismatch"- where wildlife habits change, but the environment lags behind.

Researchers with Laval University have found that high spring and summer temperatures led to fewer young surviving among snow geese on Bylot Island.

And when warming temperatures combined with increased numbers of mosquitoes, they contributed to higher numbers of deaths at some seabird colonies, say biologists with the Canadian Wildlife Service.

Since the 1970s CWS biologists have seen severe weather produce many lethal situations for seabirds.

Generally most seabirds are long-lived. Eiders live at least 10 years, murres about 30 years, and fulmars up to 50 years, so "you don't see them die very often," said Mark Mallory, a seabird biologist with the CWS in Iqaluit.

But extreme weather appears to be able to knock years off seabirds' lives, Mallory said.

These extreme weather events include:

- Wind: after an intense windstorm which saw northern fulmars leave their nests at Cape Vera, glaucous gulls plucked about 40 per cent of the eggs on one nesting ledge before the parents could return;
- Fog: Arctic fulmars with broken wings were found scattered on the sea ice or beach below the cliffs following nights of thick fog at the Cape Vera and Cape Searle colonies after the birds apparently rammed into the rocky walls or each other;
- Wind: at Coburg Island, whose seabird colony lies near a large glacier, winds with gusts of more than 120 km/h struck birds as they took off from the breeding cliffs, and they were driven into the sea so hard that they were killed on impact with the water;
- Ice: moving sea ice near a breeding colony of murres trapped adults and crushed them. Abnormal ice conditions and strong currents also seem more likely to kill birds migrating or over-wintering in polynyas;
- Erosion: about 800 murres died on Prince Leopold Island in 2005, when an entire cliff face fell apart due to erosion and crashed down, bombarding nesting birds and their chicks with bits of stone;
- Disease: seabirds aren't prepared for new parasites and diseases, such as the recent outbreak of avian cholera in Coral Harbor;
- Bugs: unusually warm breeding seasons bring high mosquito populations, which can also cause stress and death;
- Snow: during heavy snowfalls, adult seabirds go out to get food, but their chicks gets buried in snow and dies;
- Rain: glaucous gulls on Prince Leopold Island died of exposure due to a heavy rain in August, which soaked through their feathers. "High Arctic birds aren't very well adapted to that," Mallory said.

If the number of intense, freezing rain episodes or snowstorms increase in the Arctic, the CWS says the Arctic can expect higher levels of avalanches, nest abandonment, and predation.

And if warming temperatures lead to longer, hotter summers, less sea ice cover and more frequent, intense storms, the "unusual" mortality of Arctic seabirds may increase as a result.

New marine threats to seabirds are likely to accompany warmer temperatures and reduced sea ice, such as ship-based tourism, ship transport, and industrial fisheries, the CWS predicts.

So, the ways seabirds die may also become more typical of southern latitudes, where fishing, hooks, nets, collapses of food, oil spills and diseases are the main killers.

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## **6. Arctic hunters learn to adapt to changing ice conditions**

By Eilis Quinn | Radio Canada International  
Alaska Dispatch  
April 26, 2010

CLYDE RIVER, Nunavut; NUUK, Greenland -- When Joelie Sanguya thinks back on his childhood, some of his fondest memories are of growing up on the sea ice.

"It wasn't like now," the 57-year-old Inuit hunter said, gesturing around his living room. His wife Igah made hot water for tea in the nearby kitchen. His son Matthew shuffled up and down the hall in baggy jeans and a

loose black T-shirt.

"We used to live as nomads in those days," Sanguya continued. "After Christmas, when there was enough snow, we'd go out on the sea ice and make igloos.

"In those days I didn't have any math or measurements ... or anything like that. But I remember looking down through seal breathing holes and the ice was so thick, they looked like they were tapering away.

"Today you don't see that very much. You'll probably see 4 feet or 5 feet (down) and that's it."

Meanwhile, almost a thousand kilometers across Baffin Bay, an Inuit hunter in Greenland reflects on how the sea ice has changed her community.

Toku Oshima grew up fishing and hunting on the sea ice by dog team. She now owns a 10-dog team herself. And while her team has never fallen through the ice, she's seen other teams that have.

"It's dangerous," Oshima, 35, said on the telephone from her home in Qaanaaq, a town of about 600 people in Greenland's northwest. "You have to avoid the bad ice."

And way across the Arctic Ocean from Qaanaaq, Joe Leavitt, an Inupiat Inuit subsistence hunter and heavy equipment operator in Barrow, Alaska, also thought back to his childhood days on the ice.

"When I was a boy, the ice used to hover around Barrow all year," 51-year-old Leavitt said. "Now when the ice takes off it doesn't want to come back. So our hunting is very limited."

Whale hunting is central to the culture of the Inupiat in Barrow, a town of about 4,500 people. Whalers in Barrow hunt in teams. After they catch the whale, the team hauls it onto the ice.

The thinning ice not only makes it hard to pull the whale out of the water, it also puts the whaling team's lives in jeopardy.

"The sea ice just tends to break now," Leavitt, also a registered whaling captain, said. "We're almost getting used to drifting out into the ocean because of all the thin ice. People are trying to take more care. They're always ready to evacuate the ice."

### **Global temperature change warms up Arctic**

Climate scientists generally agree that, on average, sea ice is retreating and thinning throughout the North.

But despite the attention global warming in the Arctic receives, few scientists, politicians or environmental groups have been able to offer the Inuit that live in the North solutions on how to live with or adapt to the changes.

Most climate change research has focused on the ice that forms in the middle of the Arctic and that moves around in the ocean. Less attention has been paid to the landfast ice, the ice that forms alongside coasts, that Inuit communities across the circumpolar world have relied on for hunting and transportation for over 5,000 years.

So no matter how much the specific Arctic cultures or environments differ, the thinning sea ice means each community is confronting similar obstacles.

But with political borders, different dialects and thousands of kilometres between them, the communities are often facing these challenges completely alone.

However, a recent project is slowly trying to change that by bringing Joelle Sanguya, Toku Oshima and Joe Leavitt together... At the same time, on the same continent and to the environment they're most comfortable in on earth... the sea ice.

### **Arctic hunters share knowledge**

The Siku-Inuit-Hila Project was started by Canadian scientist Shari Gearheard and was funded by the National Science Foundation in the United States.

The name of the project means "Sea Ice - People - Weather." The objective of the project was to document the changing relationship of Inuit to the sea ice. But Gearheard and her science team sought to do it in a unique way, not only by having Inuit hunters working closely with scientists from the south, but by setting up monitoring stations manned by locals and allowing Inuit hunters to travel to each others communities and see how ice was changing across the Arctic firsthand.

They recruited hunters in three northern communities: Clyde River, Canada; Barrow, Alaska; and Qaanaaq, Greenland. In total, 21 hunters and scientists were involved in the project.

"It's a huge concern for scientists how the Arctic sea ice is changing," Gearheard said. "And if you're trying to understand a problem it just makes sense to have as many perspectives as you can.

"In a place like the Arctic, there's already a knowledge base (among the Inuit) that's survived and thrived in this environment for thousands of years. Science brings its own strengths and tools. It's not always easy (to bring the two knowledge bases together) but I think it's really important and is how a lot of research should be done."

### **Local communities get answers from each other**

Elder Ilkoo Angutikjuak is also part of the sea ice experts group. The 67-year-old Clyde River hunter is known in his community as one of its keenest weather forecasters. But he admits that unpredictable patterns have emerged that are making this more challenging.

"It's good to talk to the Alaska and the Greenland people about their experiences," he said through a translator in his Clyde River home as family members rushed in and out.

"Our elders predicated global warming long before anyone was talking about it. We can't change global warming. It's God's will.

"But we were able to talk about our Inuit culture, how we survive without technologies. About the tools we use."

For Lene Kielson Holm, the anthropologist in charge of Siku-Inuit-Hila's Greenland team, this was one of the most important parts of the project.

"The hunters from Alaska, from Canada and Qaanaaq were able to talk about the sea ice together, and talk about the changes," she said, sitting by ice in Nuuk's old port and looking out over water. "(They also) asked the right questions and have more answers to the questions than we have.

"They will find ways to adapt by their own ways and means."

Once a week, Teema Qillaq, a 26-year-old hunter, leaves his home with a generator and a drill. He hooks his komatik, a kind of Inuit sled, up to his snowmobile and steers it down a quiet Clyde River street.

With a sharp turn, he tears down a short embankment and blasts across the frozen sea ice near his community. Ten minutes later, Qillaq stops at a bunch of sticks and what looks like twine, sticking out of the ice.

"This is Station One," Qillaq said proudly. He unloaded his equipment and moved swiftly around the station explaining how he verifies snow and ice thickness.

"It's to measure global warming stuff," he said shyly. "I enjoy it because I have to stay outside a little bit. I have to know the ice thickness too and how it's different every year."

Getting people like Qillaq involved in measuring ice and snow in their own communities, instead of using satellite imagery or flying up a scientist from the south, was another important part of the Siku-Inuit-Hila project.

"A lot of what science understands about the Arctic and how it's changing is on a very big scale," said Andy Mahoney, a physical scientist at the University of Alaska Fairbanks who helped set up the research stations in each community. "(Science knows) 'in general' that sea ice is retreating. But of course 'generals' don't work everywhere.

"These local measurements actually allow us to see how sea ice is responding at a local level. (That's) what's really relevant to the community. We're taking measurements for the people that live there."

While the Siku-Inuit-Hila project may carry on in future with further funding, for now, the initial stage of the project is drawing to a close.

Project scientists Gearheard, Kielson Holm and Mahoney say the four-year project has built up an invaluable data bank of snow and ice readings, chronicled, in detail, the relationship between the Inuit and the sea ice in different communities and allowed them to map how hunting routes are changing over time.

This is key to understanding how communities in the North might need to adapt if sea ice changes become more extreme or even if the ice disappears in some communities altogether.

But the project also changed how the researchers perceive the sea ice, Gearheard said.

"I'm a scientist so when I look at sea ice I see what its properties are. How dense it is. But I remember sitting with the hunters when we were all in Qaanaaq. They looked at the sea ice and the first thing they said they saw was 'freedom'.

"(Sea ice) meant they could hunt for food. It meant they could travel to see relatives on the other side of the water, that they hadn't seen all year.

"That was a very powerful thing for me as a person, not just as a scientist."

As for Joëlie Sanguya, Toku Oshima, Joe Leavitt and the other Siku-Inuit-Hila hunters, all say they benefited from the project and the sea ice experts groups set up in their own communities.

And while each community is implementing what they learned in different ways, all agree they've been changed for the better by the experience.

"I don't like to think about it (the sea ice disappearing)," Leavitt, the Barrow whaling captain, said. "Our people (Inuit) have always lived through temperature and weather changes. And I think our people will find a way to adapt again and survive again.

"I hope."

*This story first appeared on Radio Canada International. It is posted on Alaska Dispatch as part of Eye on the Arctic, a collaborative partnership between public and private circumpolar media organizations.*

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## **7. Winds from Siberia reduce Arctic sea ice cover**

*Water from melting ice sheet took unexpected route to the ocean.*

By Bård Amundsen/Else Lie.  
Translation: Connie Stultz/Carol B. Eckmann  
Research Council Of Norway  
April 27, 2010

The ice cover in the Arctic has decreased dramatically in recent years. Norwegian researchers have

discovered that changes in air circulation patterns create winds that push away the ice.

In recent years, satellite images have shown large variations in the ice cover around the North Pole. The images have also shown that the ice cover in the Arctic has diminished considerably over the past 30 years, with the most drastic reductions occurring in recent years. Climate change or other causes?

The media regularly cite sources who believe that it is now only a matter of decades before climate change results in a totally ice-free Arctic during parts of the year. For instance, the UN Intergovernmental Panel on Climate Change (IPCC) projects that this may occur by the end of this century.

How much of the change in ice cover is caused by dramatic changes in the climate, and how much is the result of other factors? And what is causing the ice cover in the Arctic to disappear even faster than the climate models project?

### **The Arctic climate paradox**

A few years ago, US researchers discovered what they termed the "Arctic climate paradox". Since 1980, the researchers had been observing a decrease in ice cover. They explained this through a slow process of climate change combined with fluctuations in patterns of atmospheric pressure and air currents over the Arctic. It was believed that the positive phase of the Arctic Oscillation (AO) was a major cause of the receding ice cover.

The AO is normally influenced by three pressure systems located over the Azores, Iceland and the Northern Pacific Ocean. Since 2000 the AO has been in a negative phase. As a result, researchers predicted that the pace of reduction in the ice cover would slow down.

Instead it accelerated.

### **Unknown factor**

"The US researchers argued that the ice was responding to something else, another factor that nobody had considered," explains Asgeir Sorteberg, Associate Professor at the Geophysical Institute at the University of Bergen. He has been investigating this phenomenon along with his colleagues in the project entitled the Norwegian Component of the Ecosystem Studies of Sub-Arctic Seas (NESSAS). When the Norwegian researchers began their work, they noticed in particular a dramatic change in the weather pattern in the Arctic beginning about the year 2000. The change corresponded to the point in time when the reduction of ice cover in the Arctic began to accelerate.

### **The answer is blowing in the wind**

The researchers began to analyse the circulation patterns over the Arctic.

"We found that these patterns can explain in large part why the ice cover decreased so much more rapidly after 2000. Wind patterns depend on the position of major high-pressure and low-pressure systems. We discovered that months with very little ice cover and high temperatures corresponded with crucial variations in the wind patterns," explains Mr Sorteberg.

"Up until 2000, the Arctic Oscillation (AO) had the greatest impact on the winter ice cover in the Arctic. But the change around 2000 meant that more of the weather and wind over the Arctic after that year was determined by high-pressure and low-pressure systems in northern Russia. In other words, the AO, which was usually so crucial, played a much less important role."

### **Ice is pushed away**

"We have now managed to document what has occurred in connection with this change," says Mr Sorteberg.

The changed wind direction pushes large ice masses away from the Arctic and down along the eastern coast of Greenland. At the same time, less ice forms when the winds over the Arctic are determined by the pressure systems in northern Russia rather than those over the North Atlantic and the Pacific Ocean, as is

normally the case.

### **Extent of ice a poor indicator**

The conclusion from this research is that we should be cautious about using the extent of the ice cover as an indicator of the ice's climatic "state of health".

The extent of the ice cover is highly dependent on the wind direction, and short-term changes in the ice cover give very little indication of whether climate change is occurring in the Arctic.

"The dramatic changes in the extent of Arctic sea ice in recent years have mainly been caused by atmospheric circulation patterns that have tended to reduce ice cover, combined with a slow process of climate change. Variations in the circulation patterns are part of the natural fluctuations in the weather. In certain periods these fluctuations will reinforce manmade changes, while at other times they will mask them," says Mr Sorteberg.

### **Climate change leads to thinner ice**

Mr Sorteberg believes we should be cautious about interpreting the dramatic decrease in Arctic ice cover in the past decade as an indication that the Arctic will be ice free in 10 to 20 years.

However, he emphasises that he and his colleagues do not reject the assertion that climate change is affecting Arctic ice cover or that the IPCC is wrong when it states that the Arctic may be nearly ice free in summer towards the end of this century.

"There is no doubt that the Arctic sea ice has become thinner in recent years. The thickness of the sea ice is a much better indicator than the extent of the ice cover if we want to study how climate change may affect the ice in the Arctic," says Mr Sorteberg.

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## **8. WWF calls for international accord to govern Arctic Ocean activity**

By Randy Boswell  
Canwest News Service  
*Montreal Gazette*  
April 26, 2010

OTTAWA - A World Wildlife Fund report detailing "serious gaps" in global governance of the Arctic Ocean has the influential environmental group calling for a new international accord to regulate commercial development in the rapidly transforming region.

The WWF study identified numerous "loopholes" in maritime law, pollution regulation, shipping rules, fishing zones and other spheres of activity "that could allow irreparable damage to the marine environment, its biodiversity and Indigenous peoples."

The report claims there are "no clear responsibilities and mechanisms keeping marine resource extraction within sustainable limits, or for preventing and responding to pollution accidents and shipping disasters."

The WWF's proposed Arctic Ocean Framework Convention, to be administered largely by the eight-nation Arctic Council, would challenge the more exclusive "Arctic 5" grouping of coastal states, championed by Canada, that has recently asserted the special rights and responsibilities of states directly bordering the Arctic Ocean.

Last month, Foreign Affairs Minister Lawrence Cannon hosted a controversial gathering of his counterparts from the four other Arctic coastal countries - the United States (Alaska), Russia, Norway and Denmark (Greenland) - as a followup to the inaugural 2008 Arctic Summit in Greenland that explicitly rejected the

need for a new international treaty to govern polar affairs.

But last month's event ended with an unexpected clash between Cannon and U.S. Secretary of State Hillary Clinton, who echoed concerns about the meeting's exclusive guest list that had been voiced earlier this year by northern aboriginal groups, the European Union and three Arctic Council countries left out of the talks: Finland, Iceland and Sweden.

"Significant international discussions on Arctic issues should include those who have legitimate interests in the region, and I hope the Arctic will always showcase our ability to work together, not create new divisions," Clinton stated at the time.

"We need all hands on deck because there is a huge amount to do, and not much time to do it," she added. "What happens in the Arctic will have broad consequences for the Earth and its climate. The melting of sea ice, glaciers and permafrost will affect people and ecosystems around the world, and understanding how these changes fit together is a task that demands international co-operation."

Cannon defended the gathering of the five coastal states but emphasized that the Arctic Council - which includes Inuit and other northern indigenous groups as "permanent participants," and countries such as Germany and Britain as official observers - should remain the principal organization for pan-Arctic co-operation.

The WWF report acknowledges that the Arctic coastal states deserve special status in charting the region's future and that the international Antarctic Treaty - which prohibits commercial development on the southern polar continent - doesn't translate well to a northern ocean surrounded by states with resource rights and legitimate territorial and maritime authority.

But the report, researched and authored by international legal experts from Finland and the Netherlands, concludes that the environmental stakes are so high in the Arctic - "one of the most unique and pristine areas of the world" - that a binding multilateral convention, administered through the Arctic Council by the largest possible number of stakeholders, is crucial.

"As Arctic leaders convene, they should consider alternatives to the current piecemeal approach to managing human activity in the Arctic environment," Craig Stewart, director of WWF-Canada's Arctic program, said in a statement announcing the report's release. "The top of the planet is too fragile for a patchwork approach to governance."

He conceded the WWF proposal is "not the only possible solution" for protection the region, but challenged political leaders to "advance alternatives that would work equally well to safeguard the region," and added: "One thing is clear: we can't manage the new Arctic the way we have managed the old Arctic."

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## **9. An oceanic 'fast-lane' for climate change**

*A deep-sea current moves millions of cubic metres of water northward every second.*

By Richard A. Lovett  
NatureNews  
April 25, 2010

Work in Japan and Australia has revealed that a deep-ocean current is carrying frigid water rapidly northward from Antarctica along the edge of a giant underwater plateau.

Other research teams had previously identified a deep current along the eastern edge of the Kerguelen Plateau, a more than 2,200-kilometre-long rise some 3,000 kilometres south-west of Australia. But estimates of its speed, taken as "snapshots" by instruments deployed from research vessels, had been "all over the place", says Steve Rintoul, a physical oceanographer at the Antarctic Climate and Ecosystem

Cooperative Research Centre in Hobart, Australia, and a co-author of the new study<sup>1</sup>.

Yasushi Fukamachi, an ocean scientist at Hokkaido University in Sapporo, Japan, led a team effort to determine the exact nature of the current. The researchers moored over 30 current and temperature recorders across its probable path and left these in place for two years. When they retrieved their instruments, the scientists discovered that the current, which flows at depths well below 3,000 metres, sometimes hit speeds greater than 700 metres per hour, carrying volumes as high as 30 million cubic metres per second. No other deep current in the Southern Hemisphere is known to move that quickly.

The current is formed by cold water sinking in the Ross Sea and off the coast of Adelie Land, on the Australian-facing side of Antarctica. Once in the abyss, the water flows eastward along the coast of Antarctica before hitting the Kerguelen Plateau. Then, just as the Gulf Stream hugs the eastern edge of North America, Coriolis force from Earth's rotation causes the Antarctic water to embrace the plateau's eastern flank. The result is a narrow, and so fast-moving, stream, about 50 kilometres wide.

This is significant because it represents a "fast lane" by which climatic and environmental changes affecting the Southern Ocean can propagate northward, says Alejandro Orsi, a physical oceanographer at Texas A & M University in College Station, who was not involved in the study. Proof that this is already occurring, he adds, can be seen from the fact that the deep waters near the Kerguelen Plateau already show "clear signs" of reduced salinity relating to changes in the rate of melting of Antarctic ice sheets.

### **Natural experiment**

Understanding such currents could help scientists to predict how the world will react to increasing levels of carbon dioxide, says Richard Alley, a geoscientist at Pennsylvania State University in University Park. To begin with, he says, if heat goes into warming the deep ocean rather than surface waters, it will have less effect on sea-level rise because cold water in the ocean's depths expands less than warm surface waters. Similarly, heat and carbon dioxide contained in deep-ocean currents are sequestered from the atmosphere until the water rises back the surface, many years later.

Similar flows in the North Atlantic account for the fact that Europe is warmer than comparable latitudes in Japan, Fukamachi says. But the currents could change. "We're not saying this could happen instantaneously, like the movie *The Day After Tomorrow*," Fukamachi says, "but understanding this kind of current is very important to understanding global climate."

Nature may recently have provided an opportunity to test our understanding of how changes in these processes work. In mid-February, a giant block of ice 78 kilometres long broke off the tongue of ice spilling into the sea from the Australian Antarctic Territory's Mertz Glacier. Previously, that tongue had blocked icebergs from collecting on its western side, creating an open area where winds blowing off the Antarctic interior could rapidly produce extremely cold water that would sink to the depths and feed the deep currents.

News reports hyped the event as a disaster that could radically affect global ocean circulation, but nobody knows what the effect will be, Rintoul says. "It's like a natural experiment. I think it will teach us a lot about the processes responsible for forming this dense water."

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1. Fukamachi, Y. et al. *Nature Geosci.* doi:10.1038/ngeo842 (2010).
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