

# Northern Climate Exchange

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

NCE Update December 16, 2009



## HAPPY HOLIDAYS!

NEXT NCE UPDATE: JANUARY 6th, 2010

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### Announcements

#### **1. Employment Opportunity: Director, Climate Change Secretariat, Yukon Government, Whitehorse 09-MGR04-01**

The Climate Change Secretariat is looking for a dynamic, influential and visionary leader with a solid management track record, to provide corporate leadership to the Yukon Government in mitigating and adapting to climate change.

Reporting to the Assistant Deputy Minister, Corporate Planning & Climate



Change Division, the **Director, Climate Change Secretariat** leads cross-government efforts in relation to the Climate Change Action Plan, furthering Yukon Government achievement of its corporate climate change goals.

Download pdf for [Job posting](#)

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For more information go to [www.employment.gov.yk.ca](http://www.employment.gov.yk.ca) or contact Joy Waters at (867) 667-5460 or email [joy.waters@gov.yk.ca](mailto:joy.waters@gov.yk.ca)

Competition Closes January 04, 2010

## **2. New Resource: Online Tips Help Yukoners Make Energy Efficient Choice - Dec 14, 2009 #09-286**

WHITEHORSE - A new series of information sheets designed to help people make energy efficient choices when renovating homes or buying new appliances was announced today ... to help Yukoners interested in making informed choices that will result in long term energy and cost savings....

The **Easy Money tip sheets** and other information on energy efficiency can be found at the **Energy Solutions Centre** website [www.esc.gov.yk.ca](http://www.esc.gov.yk.ca)

The full news release is viewable at:

<http://www.gov.yk.ca/news/2009/09-286.html>

## **3. Course: Climate Change in the Circumpolar World - Yukon College**

Climate change is a critical topic for the North and once again, Yukon College is offering a course on **Climate Change in the Circumpolar World**.

The 3-credit course, **GEOG 290**, looks at the science and local knowledge of climate, where we are coming from and where we are going. It examines the impacts of a warming globe on the North and how the North feeds back to the entire planet. The course addresses responses to climate change from adaptation to mitigation and from the personal to the political.

This course is ideally suited to decision makers, resource people and researchers who need a clearer understanding of this crucial topic.

When: Tuesdays 7-10 pm. from **January 5th to mid-April, 2010.**

Instructor: **John Streicker**

For more information on the course; [Download the pdf](#).

## **4. Copenhagen Venue: Climate change is already happening in vulnerable Coastal communities in the Arctic and in Small Island Developing States - Dec 17**

Climate change is already happening in vulnerable Coastal communities in the Arctic and in Small Island Developing States have common challenges in the face of climate change. The event will focus on present and future climate change, consequences already noticed and adaptation needed due to ice melt in the north and sea level rise in the south.

**NEW TIME AND VENUE:** Thursday 17 Dec 17:00-18:30. The Norröna boat, room "Viking" at Nordre tollbod 24 at the Copenhagen harbor, 15 minutes walk from Kongens nytorv. Open access for everyone!

**Programme:**

- **Climate Change and the Cryosphere: Snow, Water, Ice and Permafrost in the Arctic** - Short film introduced by Morten S. Olsen, Arctic Monitoring and Assessment Programme (AMAP)
- **How climate change in the Arctic affects the world** - Pål Prestrud, Center for International Climate and Environmental Research - Oslo (CICERO)
- **Inaction will mean calamity for low lying islands in the Pacific** - Taito Nakalevu, South Pacific Regional Environment Programme (SPREP)
- **Climate change and impacts on human societies in the Arctic** - Susan A. Crate, George Mason University
- **20 years of inaction** - Roxanne Brown, Caribbean Youth Environment Network - Trinidad and Tobago
- Discussion and reception with finger food and drinks

Organised by: Many Strong Voices, CICERO, UNEP, Climate Law & Policy Project, George Mason University, AMAP

[www.cicero.uio.no](http://www.cicero.uio.no)

## 5. Climate Counts Scores (3rd Annual): Comparing companies on their commitment to tackling global warming.

Despite a sustained economic downturn, leading corporations appear to be strengthening their voluntary response to climate change. **Climate Counts** has just released their third annual corporate climate scores for 90 well-known consumer companies, and there's reason for hope.

81 of the 90 companies improved their scores by at least 22%, and there were significant gains among those previously in the index's lowest tier.

[Read the full Press Release](#)

[Download the Scorecard Report](#)

[View all 2009 company scores](#)

[www.climatecounts.org/](http://www.climatecounts.org/)

## 6. Statement from the UK science community - Dec 10, 2009

..."As professional scientists, from students to senior professors, we uphold the findings of the IPCC Fourth Assessment Report, which concludes that 'Warming of the climate system is unequivocal' and that 'Most of the observed increase in global average temperatures since the mid-20th century is very likely due to the observed increase in anthropogenic greenhouse gas concentrations'."

[Read complete statement and list of signatories.](#)

[www.metoffice.gov.uk](http://www.metoffice.gov.uk)

## Articles

### 1. Climate change costly for Inuit: study

The Canadian Press  
*CBC News*  
 December 15, 2009

A new study suggests the financial burden of Arctic climate change is already falling on Inuit people and the

heaviest costs are hurting those families least able to pay.

The study backs demands made by Inuit leaders for a share of global funds being proposed to help adapt to a warming planet. It says governments should shift some of their funding focus to help the Inuit meld new tools with traditional knowledge to survive in today's North.

"Inuit can adapt to climate change," says James Ford, a geographer at Montreal's McGill University, whose paper will be published early in 2010. "We have a number of concerns about whether Inuit can afford to adapt."

Concrete examples of climate change in the North have been piling up for years. Temperatures are rising at twice the global average, sea ice is disappearing and becoming more dangerous and weather is becoming less predictable.

The Inuit, many of whom rely on the land for some or all of their food, are adapting. They've begun to use GPS locators, satellite phones and immersion suits to stay safe. They've bought all-terrain vehicles to back up their snow machines because the land stays bare longer, and they're stalking their prey from boats as sea ice grows less reliable. They've found new places to hunt and new ways to get to old ones.

But those adaptations cost money, Ford said.

Early results from another of Ford's projects suggest that new hunting routes developed to bypass now-unreliable ice or newly uncrossable rivers average twice as long as the originals. Gas for snow machines or ATVs currently sells in Iqaluit for about \$1.20 a litre.

And the families that rely most heavily on hunting are the least likely to be plugged into the wage economy.

"These adaptations always involve more money, money that many households don't have access to," he said.

### **Climate change brings new dangers**

As well, younger hunters don't always have the same survival skills their elders had. Many need to be trained to recognize danger and get themselves out of a jam.

"These skills aren't being passed on as much as they need to be," Ford said. "At the same time, climate change is making [the land] more dangerous."

His report says evidence suggests that climate-related accidents are increasing.

Finally, the federal government has cut back on weather forecasting in the North at a time when conditions are becoming less predictable. Four forecasters now cover the entire Arctic. All are based in Winnipeg instead of the North and they rely on generalized satellite data instead of specific local information that hunters need.

"I was talking to local people [in Iqaluit] and they noted that over the last five, 10 years the quality of the forecasts have significantly decreased," Ford said.

Some federal and territorial programs have already begun to address the costs of adapting, Ford acknowledges. But he points out that more changes in the Arctic are inevitable and government policy has to focus as much on dealing with them as with reducing greenhouse gases.

Ford's current study doesn't estimate the actual costs, but he supports recent statements from Mary Simon, head of Canada's main Inuit group, that northern peoples around the world should be eligible for the proposed adaptation fund being discussed at the climate conference in Copenhagen.

"I think there's a strong case for Inuit to have access to a vulnerable peoples' adaptation fund," he said.

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## **2. Film festival brings Inuit perspective to climate conference**

CBC News

December 9, 2009

A festival of films documenting the impact of climate change by Indigenous filmmakers from around the world opened Wednesday in Copenhagen in conjunction with the United Nations climate conference currently underway.

The UN-sponsored Indigenous Voices on Climate Change Film Festival will screen 22 short documentary films by filmmakers from Tajikistan, Panama and other areas affected by climate change.

One of the filmmakers featured is Canadian Inuit filmmaker Zacharias Kunuk, who produced and directed the critically acclaimed films *Atanarjuat* and *The Journals of Knud Rasmussen*. He will screen a 15-minute portion of his new film, *Inuit Knowledge and Climate Change*, on Thursday.

Kunuk worked with climate scientist Ian Mauro of the University of Victoria and Inuit elders to tell the story of climate change.

One of the people Kunuk features in the film is Siila Watt-Cloutier, former international chair of the Inuit Circumpolar Council from 2002 to 2006 and a leading activist on issues related to global climate change.

"Climate change here in the Arctic is very rapid," Watt-Cloutier says in the film. "The effects and impacts of climate change challenge and threaten our very life and our ability to exist as an indigenous people."

Scientists such as Mauro agree that the impact of climate change will be felt more in the Arctic than in other parts of Canada. The observations of people living on the land are an important part of the body of evidence about climate change, Mauro told CBC News.

"I've been literally emailing with NASA scientists about the observations ... that Inuit have around changes to the sun and the stars and the position of the Earth on its axis," Mauro said.

The words of traditional hunters and elders seem to bear out climate scientists' evidence that global warming is already affecting the North.

"We live among glaciers," says Jamesie Mike, an elder from Pangnirtung, Nunavut, in the film. "The glaciers never melted in summer, but now, they melt. That is a noticeable change "

### **Festival to be screened online on Isuma TV**

Kunuk interviewed several elders to paint a picture of the effects of global warming on weather and the animals.

"In the last 10 years, I've really noticed that the inlets would freeze up in October where we hunt seals at breathing holes," said Tabitha Mullin, a hunter from Resolute Bay. "Now, we do this in November."

Another Resolute Bay elder, Dora Pudluk, sees a difference in the quality of skins her people get from seals.

"What I have noticed - I'm not sure if it's the climate change or the mining companies that is the cause - but in the past, the condition of seal skins and fur was excellent, but since mining and perhaps climate change, the quality and health of sealskins has declined," she said.

Elders speak of unusual winds, melting sea ice and a sun that seems hotter than before.

Kunuk says he hopes that people will be impressed by hearing elders in the North speaking with one voice in his film.

Also part of the festival is *Maara*, by filmmaker Félix Pharand, about a young Inuk who is seeking ways to drastically reduce energy consumption in his village. The six-minute film is already available through the online indigenous TV channel Isuma TV.

Isuma TV will screen all of the festival films as part of a live internet broadcast hosted by Kunuk and Mauro from Igloolik, Nunavut, on Dec. 10 p.m. between 12 p.m. and 10 p.m. ET.

"We don't need to travel there and burn more fossil fuels," Kunuk said. "We can use digital technology to share what we have found with the world."

The festival runs until Saturday.

[Inuit Knowledge and Climate Change](#) will be released as a feature-length film by Igloolik Isuma Productions in 2010.

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

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### **3. Canadian species among most threatened by climate change**

By Randy Boswell,  
Canwest News Service  
*Vancouver Sun*  
December 14, 2009

Canada is home to five of the 10 new "hit list" species identified Monday as the likeliest victims of climate change by the IUCN, a leading global nature organization.

The International Union for Conservation of Nature, the world's largest and oldest network of environmental scientists, has listed the Arctic fox, leatherback turtle, beluga whale, salmon and ringed seal among 10 species "destined to be hardest hit by climate change."

The study, released in Copenhagen to coincide with global climate negotiations, notes that another Canadian icon - the polar bear - has emerged as the poster species for the climate crisis, but that other plants and animals around the planet are equally vulnerable.

"The polar bear has come to symbolize the impacts of climate change on the natural world," the IUCN report states. "But it is only one of a multitude of species affected, and many of these are also well-known, much-loved and important to people."

The new "flagship species" placed in the spotlight were "chosen to represent the impact that climate change is likely to have on land and in our oceans and rivers."

The Canadian animals listed in the report - titled "Species and Climate Change: More Than Just the Polar Bear" - cover all three coastal regions of the country. Leatherback turtles are the focus of a conservation campaign in Atlantic Canada; salmon are an important commercial fish on both the east and west coasts; the beluga ranges widely in the country's Arctic and sub-Arctic marine habitats - as well as the Gulf of St. Lawrence - and the Arctic fox and ringed seal occupy important niches in the northern food web.

In detailing the risks faced by the Arctic fox, the IUCN highlighted the transition of tundra habitat to less suitable boreal forest, competition from northward-moving red foxes and declines in traditional prey.

The study also notes how complex interrelationships between vulnerable species could affect populations in a domino-like fashion.

"Because polar bears and ringed seals are expected to decline due to climate change," the report states, the Arctic fox's "coastal populations are likely to face reductions in alternative food sources such as ringed seal pups and the remains of polar bear prey."

The five other species cited in the IUCN report are the staghorn coral of the world's southern seas, Antarctica's emperor penguins, southern Africa's quiver tree, the tropical clown fish and Australia's koala.

"Humans are not the only ones whose fate is at stake here in Copenhagen - some of our favourite species are also taking the fall for our CO2 emissions," report co-author Wendy Foden, an IUCN climate change program officer, said in a statement.

"This report should act as a wake-up call to governments to make real commitments to cut CO2 emissions if we are to avoid a drastically changed natural world. We simply don't have the time for drawn-out political wrangling. We need strong commitments and we need them now."

[Download IUCN report](#) (791 KB)

[www.vancouver.sun.com](http://www.vancouver.sun.com)

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#### **4. Aariak: Nunavut needs help with alternate energy**

Jane George  
Nunatsiaq News  
December 15, 2009

COPENHAGEN - Nunavut has the natural resources to break its heavy dependence on fossil fuels, but none of the money that other Canadian jurisdictions have to develop non-polluting energy sources, Premier Eva Aariak said Dec. 15 at the COP15 climate change conference in Copenhagen.

Aariak and her environment minister Daniel Shewchuk, who arrived in Copenhagen Dec. 13, were among the 140 officials, delegates, members of non-governmental organizations and journalists who listened to the session, organized by the Climate Registry, a non-profit collaboration among North American states, provinces and territories.

The premiers and governors from the states of Washington and Wisconsin said it's important to forge ahead with measures to cut emissions - no matter how lukewarm the support from national governments.

They vowed to continue their efforts, even if Dec. 18 doesn't produce a global deal on climate change.

During a week filled with grim scientific predictions, the premiers of British Columbia, Quebec and Manitoba, described how they have forged ahead with emissions cuts at a Dec. 15 side event.

Gordon Campbell, the premier of B.C., attributed his province's progress in cutting emissions to tax incentives for wind, solar and water power development.

By 2020, 90 per cent of B.C.'s energy will come from non-polluting, renewable resources, Campbell said.

The changeover to new technology also has led to more jobs, without their having to wait for the federal government to act.

"That's happening because we won't wait. If we can imagine it, we can do it," Campbell said.

Jean Charest, premier of Quebec, also enthused about Quebec's plans to ramp up hydroelectric power in the north and encourage residents to cut energy consumption.

Quebec has been "leading by default" in the drive to lower emissions and fight climate change because Canada's federal government hasn't moved forward, Charest said.

Manitoba has made new alliances with its neighbors and built sustainable hydroelectric projects, negotiated with native peoples, said premier Greg Selinger.

Manitoba also encourages measures to cut emissions from other sources, like dumps.

These are all impressive achievements and plans, about which Nunavut can only dream about now, Aariak admitted.

The challenge for Nunavut to lower its emissions is "daunting" due to a lack of infrastructure and money, although the GN continues to do research and development into wind, solar, tidal and hydro-electric power, Aariak said.

But there's new urgency for getting these new clean energy sources in place "because climate change is affecting us now," Aareak said.

Nunavut was the last of Canada's three territories to join the registry last year.

The registry sets standards, which are used calculate, verify and publicly report greenhouse gas emissions.

All its members voluntarily measure, verify, and publicly report greenhouse gas emissions, after first establishing their emissions baseline, that is, the amount of emissions they produce now.

This figure is then used to document reductions.

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

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## **5. NASA Takes a Rare Look at Warming Arctic**

NASA

December 15, 2009

HAMPTON, Va. -- A NASA field campaign to study man-made and natural influences on the Arctic atmosphere delivered a collection of rare data that is illuminating the impact of industrial pollution from Europe and Asia, and smoke and soot from agricultural and forest fires.

NASA's first in-depth airborne campaign to sample the Arctic atmosphere in years, the Atmospheric Composition of the Troposphere from Aircraft and Satellites (ARCTAS) mission took place in the spring and summer of 2008. It was the first in-depth airborne campaign to sample the Arctic atmosphere in years beginning in cooperation with NOAA, the Department of Energy, and international agencies as part of the International Polar Year.

Scientists from NASA and a number of universities will be presenting their ARCTAS research results from the campaign during the American Geophysical Union's fall meeting in San Francisco from Dec. 14-18.

Aircraft observations revealed a stronger influence of Asian pollution than previously thought and saw smoke plumes travel to the Arctic from great distances. While ground-based instruments and satellites make routine measurements, these up-close airborne measurements provide a more finely resolved look at the changing chemistry of the Arctic, the most rapidly warming region on Earth.

"For scientists interested in studying the role of changing atmospheric composition on climate, the ARCTAS data will represent the best and often only detailed information available for this poorly characterized region," said Jim Crawford, a research scientist at NASA's Langley Research Center and the ARCTAS program manager during the campaign.

Tiny, airborne particulates called aerosols, produced from sources including industrial exhaust and fires, can be carried to the Arctic in massive plumes. Smoke and pollution can act as warming agents, by absorbing incoming solar radiation and reflected infrared radiation from Earth, or sometimes as cooling agents, by reflecting sunlight before it reaches the surface depending on the composition of the aerosol.

These aerosols can also be deposited on the Arctic's snowy and icy surfaces and darken the natural albedo (surface reflectivity of the sun's radiation at the polar ice cap, causing radiative heating right at the surface.

Daniel Jacob, a Harvard University atmospheric scientist and ARCTAS mission scientist and co-principal investigator, said early ARCTAS results have been surprising and become an important tool.

"We're getting to the point where results from ARCTAS are getting into climate models. We're able to test different models of snow albedoes, and we've been able to introduce some corrections," Jacob said. "The Asian pollution we saw turned out to be a much larger influence on Arctic haze than what had been traditionally ascribed."

Temperatures in the Arctic are increasing and the extent of summer sea ice was recently measured at 40 percent below its 20-year average. As scientists continue to study the make-up of the Arctic atmosphere to unlock the chief causes of the warming trend, the most accurate data possible is a necessity.

The airborne ARCTAS measurements were made from three NASA aircraft -- the DC-8, P-3 and B-200 - during the spring and summer of 2008.

For more information: [www.espo.nasa.gov](http://www.espo.nasa.gov)

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

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## **6. Inuit have mixed views on CO2 cuts**

CBC News  
December 13, 2009

A rift is developing among the many Inuit who have travelled from Canada, Greenland and Alaska to attend meetings in Copenhagen, where world leaders have been trying to reach a new agreement to cut greenhouse gas emissions.

The debate causing the split is over the development of oil, gas and uranium mining.

All Inuit leaders agree climate change is having a big impact on their communities, with the melting of sea ice, permafrost and glaciers. They're calling on the countries at the United Nations summit in Copenhagen to take action and make serious cuts in greenhouse gas emissions.

But some Inuit leaders argue that if those cuts go through, their communities shouldn't have to comply.

Maliina Abelsen, the minister of social affairs for Greenland's self-government, said Greenland needs revenue to achieve full independence from Denmark and meet the needs of its people. To do that, Greenland is counting on developing its oil, gas and mineral sector.

Abelsen said the territory can't do that without an increase in its CO2 emissions.

"We have a situation that is fairly comparable to developing countries and economies in transition," she told

CBC News this weekend. "Our position is also very similar to that of the developing country."

Abelsen is now the second Inuit leader to call for an emissions exemption for northern communities. A few days ago, the Alaska chair of the Inuit Circumpolar Council made the same suggestion.

That worries Nobel Prize nominee Sheila Watt-Cloutier, an Inuk activist who has travelled the world and won many awards for her work on climate change.

The Arctic is feeling the serious effects of a warming climate, she said, and all the world needs to make cuts, including Inuit.

"We must not [be] looking to the quick fixes and not looking at what it is we're going to lose as we move towards the quick fixes," she said.

Watt-Cloutier said there's a contradiction between what some leaders are asking for and what they're willing to do. She called for a meeting of all Inuit leaders from the Arctic, saying they need to discuss the matter in depth.

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## **7. Climate change eroding coast at accelerating rate, scientists find**

By Tim Bradner  
Alaska Journal of Commerce  
December 11, 2009

Coastal erosion isn't the only climate-related problem confronting rural communities.

Health officials now are concerned about food and water safety in northern villages as warming temperatures thaw ice cellars and melting permafrost increases the organic content in rivers, creating problems in village water treatment plants.

As for erosion, it isn't yet being tracked in a widespread, systematic way. But it appears to be accelerating in places where it is documented. A few years ago, the Beaufort Sea was cutting about 10 meters a year into the shoreline in Cape Halkett, in the National Petroleum Reserve-Alaska. That has recently doubled to 50 meters a year in certain places.

Increased erosion is presenting problems within the petroleum reserve. Erosion has the potential to expose old oil and gas drill sites and reserve pits, where contaminants are stored.

Farther east, near the producing oil fields in the Prudhoe Bay area, production pads, pipelines and utility lines have been installed near the shoreline.

There are other changes: Barrier islands along the Beaufort Sea coast have always moved: gravel islands are pushed by waves and wind. Those islands are moving faster now.

Narwhal Island, a small barrier island near Prudhoe Bay is being tracked by University of Alaska scientists, and is currently moving about 25 meters a year. That's up from the previous pace of 4 meters a year.

These events, among others, were cited as scientists and state officials who monitor the effects of climate change gathered for an information-sharing conference in Anchorage Nov. 25.

An immediate concern is for Point Hope, two officials with the Alaska Native Tribal Health Consortium said at the gathering. Community officials there worry that the lateness of the formation of shore-fast ice this year presents a danger that an early-winter storm surge could overwhelm a seawall and endanger the

community, said Mike Brubaker, with the tribal consortium's health group.

The thawing of ice cellars in several villages poses different problems. In Kivalina, on the coast, and Noatak, which is inland, ice cellars that were frozen year-round a decade ago now thaw and flood in the summer, causing spoilage of food stored in cellars, Brubaker said.

There are some reports of ice cellar thaw as far north as Barrow.

Cellars are important for safe storage of subsistence foods that can be gathered only at certain times of the year. Increased spoilage increases threats of food-related sickness.

Another problem was cited by John Warren, with the tribal consortium's engineering group. The gradual thawing of permafrost around tundra lakes and along streams has resulted in more organic material in the water and more algae growth, which complicates the operation of water treatment plants, he said.

Tom Ravens, of the University of Alaska Anchorage's school of engineering, said coastal erosion in the Arctic is caused when storm surges pound at the base of coastal bluffs that are often 80 percent permanently frozen ice, with the remaining soil being very fine. Waves eat into the base of the bluff, destabilizing it until the bluff collapses.

While this process has occurred for many years in the Arctic, the warming of water temperatures in the Beaufort Sea appears to be causing it to accelerate. Ocean water temperatures appear to have increased 2 degrees to 2.5 degrees Celsius over 30 years, with higher increases in near-shore areas, Ravens told the group.

The retreat of the Arctic icepack, a consequence of climate change, is the likely cause of water temperature increases, because without the historic ice cover the open waters of the Arctic are receiving and trapping more heat from the sun.

Higher water temperatures also may explain the acceleration of the movement of Narwhal Island. While increased wave action, another consequence of less ice cover, could be partly to blame for the movement, it is also likely that the thawing of gravel in the island due to warmer water makes the gravel more mobile.

"These gravels were historically frozen but they are now thawing, which makes their transport easier," Ravens said.

Most barrier islands along the Arctic coast are in gradual motion and some may be accelerating. Aerial photos traditionally have been used to monitor changes in the coastline, but ice cover can complicate the interpretation of the photos.

UAA has tracked Narwhal Island with precision over the last few years through the placement of micro-instruments in the gravel. BP has supported the research because of its interest in the stability of offshore barrier islands and in support of offshore oil and gas installations.

Measuring of coastal erosion is done mostly at points near projects or communities. A broader, regional approach is needed to predict changes linked to plausible climate change scenarios so that locations of facilities near shores or rivers can be planned.

Ravens and David Atkinson, a professor at the University of Alaska Fairbanks' International Arctic Research Center, who joined the conference discussion late, said they plan to apply for a National Science Foundation grant to develop a modeling for such a program.

John Madden, of the state Division of Emergency Services, told the group his agency is cooperating with federal agencies to deal with a range of climate change issues, including security and maritime safety, as more open water in the Arctic leads to increased navigation.

"The security issues are obvious. The ships are there, and we need to know who they are. There are increased risks that bad things could happen, from spills to strandings and medical emergencies," Madden

said.

These are challenging enough problems with the smaller ships that have been up there, but when there are larger vessels in the area, the problems are compounded, he said.

A warmer climate has also made predictions of spring river breakups more difficult.

Officials in the past could predict the Yukon River breakup with some precision, but that is more difficult now. Monitoring the annual spring river breakup helps agencies warn river communities of flood danger from ice jams.

Alaska is at the forefront in dealing with climate change but many states are similarly engaged in monitoring risks, from increased extreme weather events, like the possibility of tornados in Vermont, to the drying up of aquifers to destabilization of structural foundations, particularly bridges.

The U.S. Army Corps of Engineers also is more focused on climate change issues nationally, said Jon Zufelt, with the Corps' cold regions engineering laboratory. The Corps is interested in sea level changes, he said. The agency is looking at the available storm and wave data for the last 100 years in southern California.

"If we build a structure for a 50-year design life, is that still true?" Zufelt asked. "Is it more like 35 years now?"

Madden said another problem is that federal disaster and hazard-mitigation programs do not fit well with the kinds of problems presented by climate change.

Current disaster programs are designed for events that are imminent or have occurred, like hurricanes. They can't be used for more longer-range threats, like climate change-related flooding that can be predicted, but are not imminent disasters, he said.

There are also hazard mitigation programs allowing government bodies to identify a threat that can be prevented. But these are specific and project-oriented, not general.

"The funding is good, but is for very limited purposes," Madden said.

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

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## **8. Climate change in Arctic could bring Pacific mollusks, other species to Atlantic**

By Krista Armstrong  
Canadian Press  
*Google News*  
December 14, 2009

HALIFAX, N.S. - Mollusks from the Pacific could march into the Atlantic Ocean within decades because of the melting of Arctic sea ice, researchers in California say.

For mollusks to pass, the Arctic would need to have less than 75 per cent sea-ice cover for 125 consecutive days - something that could happen around 2050, according to an estimate two years ago by the Intergovernmental Panel on Climate Change.

But Peter Roopnarine, curator of geology and paleontology at the California Academy of Sciences in San Francisco, says that could happen sooner.

"We could be looking at between 2020 and 2030," says Roopnarine, who based his prediction on models of climate change within the last three years.

Roopnarine and Geerat Vermeij, a geologist and evolutionary biologist at the University of California, Davis, say Pacific-to-Atlantic migration is probable for all kinds of sea life, including fish, crabs, sea stars, sea urchins and seaweed.

They base much of their theory, which first appeared in the scientific journal *Science* last year, on fossil records from the last time mollusks traversed the Arctic: about 3.5 million years ago.

At the time there was a shift in climate, which kept the Bering Strait open long enough to allow hundreds of species, such as mollusks, cod and herring, to migrate from the Pacific to the Atlantic over the ice-free Arctic.

Some of the species became extinct, but others colonized the Atlantic and continue to populate its waters today.

Roopnarine says a similar phenomenon is in the offing.

"A lot of fish, for example, are certainly going to be part of this invasion," he says.

"It's going to change the entire composition of the Northwest Atlantic ecosystem."

Roopnarine said this migration could bring new fisheries to Atlantic Canada.

He added that it's possible some species would be able to make the journey in one summer, though most would move through the Arctic waters more gradually.

The entire journey, he predicts, would take "at most a few years."

Depending on their size, mollusks may arrive in a number of ways, such as being carried by currents, crawling, and floating on seaweed or logs, Vermeij says.

He says most creatures would travel eastward because of currents and Pacific species tend to be larger, therefore more able to cross the Arctic Ocean.

Those that cross would likely stay in the Northwest Atlantic because waters east of that area are too warm, Vermeij says.

There is evidence that a modern-day inter-oceanic migration may have already begun.

In 1999, British oceanographer Chris Reid discovered a microscopic Pacific plant known as the *Neodenticula Seminae* diatom in the Atlantic Ocean which has since settled and spread throughout Northwest Atlantic waters.

Reid says the plant was in the North Atlantic until 800,000 years ago, when waters became too cold for it to survive.

Reid and other researchers from the Hardy Foundation for Ocean Science in England concluded that the plant travelled from the Pacific over Arctic waters into the North Atlantic.

In 1998, Arctic ice retreated to the north of Alaska and Canada for the first time on record, leaving open water all the way from between the Pacific to the North Atlantic, Reid says.

"So, it fits the story really well," he says.

The only other plausible theory, says Reid, is that the diatom came from a ship's ballast water. But he doesn't think that's likely because ships do not discharge their water in the middle of the ocean, where they found the plant.

Since its discovery, the plant has spread from the Labrador Sea down the East Coast. A large concentration was found in the Gulf of St. Lawrence in 2001.

Michel Starr, a scientist with the Department of Fisheries and Oceans, said the ecological impact of the plant on the North Atlantic coast has not yet been determined.

Starr says it is still present in the Gulf of St. Lawrence but there are less than there were in 2001. He said he doesn't know why.

Starr believes more organisms will follow the plant's route, which will carry implications on current life in the Atlantic Ocean.

"We can expect a reorganization of the North Atlantic ecosystem," says Starr.

While some invasive species, like the European green crab, have displaced native species along both coasts of Canada, Vermeij is not worried about the mollusks having the same effect.

"They're not going to eliminate the Atlantic species," he said.

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## **9. Foreign Minister Støre and former Vice President Al Gore present report on melting ice at climate summit**

Norwegian Ministry of Foreign Affairs  
Press Release No.: 120/09  
December 14, 2009

**For the first time ever, leading international scientists have drawn up a report on the status of the parts of the world covered by snow and ice. The conclusion is that they are disappearing faster than anticipated. "This is disturbing news. The world's leaders must reach an agreement that ensures dramatic cuts in emissions of greenhouse gases," commented Norwegian Foreign Minister Jonas Gahr Støre.**

Today, Norwegian Foreign Minister Jonas Gahr Støre and former US Vice President Al Gore are presenting a report on the melting of the cryosphere - that areas of the world covered by snow and ice - at a side event at the climate summit in Copenhagen (COP15). Mr Støre and Mr Gore requested a group of the world's leading climate researchers to produce the report at the conference on melting ice in Tromsø in Norway, in April. The Norwegian Polar Institute has coordinated their work.

The report shows that snow and ice are melting at an alarming rate, and that the cryosphere is very vulnerable to climate change. The most important new findings relate to Antarctica. Mighty Antarctica, which previously seemed immune to the loss of ice that has occurred in other areas, shows signs of a net reduction of ice on a similar scale to that of inland Greenland.

"This gives cause for concern. The overriding message is that we have to succeed in Copenhagen. The countries of the world must agree on measures that limit emissions of greenhouse gases, and restrict global warming to two degrees. Furthermore, we need an emergency plan for the cryosphere, with immediate measures to save as much of our ice and snow cover as possible. We should start by cutting emissions of short-lived drivers of climate change such as soot and ozone, which are not included in any climate agreement today, and we also need to pay more attention to short-lived greenhouse gases such as HFCs and methane. Measures to reduce these would have immediate effect and cost relatively little," said Mr Støre.

"This report, the result of over two year of work with Foreign Minister Store and many of the world's top scientists, demonstrates that we must take action now to solve the climate crisis. The Arctic ecosystem, the

world's glaciers, indeed the entire cryosphere is at risk if we don't cut the pollution that causes global warming," said Mr Gore.

The report shows that:

- The rate of reduction in the Greenland ice cap has tripled in the last ten years alone.
- Snow cover is diminishing, and glaciers from the Himalayas to the Alps are melting rapidly, with the greatest reductions in the Andes and the Rockies.
- The previous figures from the UN Intergovernmental Panel on Climate Change, which were published in 2007, indicated that sea levels would rise by almost half a metre by 2100; this is now a minimum estimate. Since the rate of melting in Greenland and other areas is now faster than anticipated, it is now estimated that sea levels will rise between 0.5 and 1.5 metres by 2100, and in the worst case by 2.0 metres. This will affect many hundreds of millions of people living in coastal areas.
- When snow and sea ice melt, less sunlight is reflected away from the surface of the Earth, and when permafrost melts, more methane and CO<sub>2</sub> are released. Both these changes further increase global warming and thus cause ice to melt even faster.
- The melting of glaciers can cause extensive water shortages. Today, more than a billion people depend on water from the Himalayan plateau, which is often referred to as the "third pole".

Read the report here: [www.regjeringen.no/callforaction](http://www.regjeringen.no/callforaction)

[www.regjeringen.no](http://www.regjeringen.no)

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## 10. NASA Outlines Recent Breakthroughs in Greenhouse Gas Research

NASA

December 15, 2009

WASHINGTON - Researchers studying carbon dioxide, a leading greenhouse gas and a key driver of global climate change, now have a new tool at their disposal: daily global measurements of carbon dioxide in a key part of our atmosphere. The data are courtesy of the Atmospheric Infrared Sounder (AIRS) instrument on NASA's Aqua spacecraft.

Moustafa Chahine, the instrument's science team leader at NASA's Jet Propulsion Laboratory, Pasadena, Calif., unveiled the new product at a briefing on recent breakthroughs in greenhouse gas, weather and climate research from AIRS at this week's American Geophysical Union meeting in San Francisco. The new data, which span the seven-plus years of the AIRS mission, measure the concentration and distribution of carbon dioxide in the mid-troposphere--the region of Earth's atmosphere that is located between 5 to 12 kilometers, or 3 to 7 miles, above Earth's surface. They also track its global transport. The product represents the first-ever release of global carbon dioxide data that are based solely on observations. The data have been extensively validated against both aircraft and ground-based observations.

"AIRS provides the highest accuracy and yield of any global carbon dioxide data set available to the research community, now and for the immediate future," said Chahine. "It will help researchers understand how this elusive, long-lived greenhouse gas is distributed and transported, and can be used to develop better models to identify 'sinks,' regions of the Earth system that store carbon dioxide. It's important to study carbon dioxide in all levels of the troposphere."

Chahine said previous AIRS research data have led to some key findings about mid-tropospheric carbon dioxide. For example, the data have shown that, contrary to prior assumptions, carbon dioxide is not well mixed in the troposphere, but is rather "lumpy." Until now, models of carbon dioxide transport have assumed its distribution was uniform.

Carbon dioxide is transported in the mid-troposphere from its sources to its eventual sinks. More carbon dioxide is emitted in the heavily populated northern hemisphere than in its less populated southern counterpart. As a result, the southern hemisphere is a net recipient, or sink, for carbon dioxide from the north. AIRS data have previously shown the complexity of the southern hemisphere's carbon dioxide cycle,

revealing a never-before-seen belt of carbon dioxide that circles the globe and is not reflected in transport models.

In another major finding, scientists using AIRS data have removed most of the uncertainty about the role of water vapor in atmospheric models. The data are the strongest observational evidence to date for how water vapor responds to a warming climate.

"AIRS temperature and water vapor observations have corroborated climate model predictions that the warming of our climate produced as carbon dioxide levels rise will be greatly exacerbated -- in fact, more than doubled -- by water vapor," said Andrew Dessler, a climate scientist at Texas A&M University, College Station, Texas.

Dessler explained that most of the warming caused by carbon dioxide does not come directly from carbon dioxide, but from effects known as feedbacks. Water vapor is a particularly important feedback. As the climate warms, the atmosphere becomes more humid. Since water is a greenhouse gas, it serves as a powerful positive feedback to the climate system, amplifying the initial warming. AIRS measurements of water vapor reveal that water greatly amplifies warming caused by increased levels of carbon dioxide. Comparisons of AIRS data with models and re-analyses are in excellent agreement.

"The implication of these studies is that, should greenhouse gas emissions continue on their current course of increase, we are virtually certain to see Earth's climate warm by several degrees Celsius in the next century, unless some strong negative feedback mechanism emerges elsewhere in Earth's climate system," Dessler said.

Originally designed to observe atmospheric temperature and water vapor, AIRS data are already responsible for the greatest improvement to five to six-day weather forecasts than any other single instrument, said Chahine. JPL scientists have shown a major consequence of global warming will be an increase in the frequency and strength of severe storms. Earlier this year, a team of NASA researchers showed how AIRS can significantly improve tropical cyclone forecasting. The researchers studied deadly Typhoon Nargis in Burma (Myanmar) in May 2008. They found the uncertainty in the cyclone's landfall position could have been reduced by a factor of six had more sophisticated AIRS temperature data been used in the forecasts.

AIRS observes and records the global daily distribution of temperature, water vapor, clouds and several atmospheric gases including ozone, methane and carbon monoxide. With the addition of the mid-tropospheric carbon dioxide data set this week, a seven-year digital record is now complete for use by the scientific community and the public.

For more on AIRS, see <http://airs.jpl.nasa.gov/> .

[jpl.nasa.gov](http://jpl.nasa.gov)

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*The next Update from the Northern Climate ExChange will be sent out **Wednesday, January 6, 2010***

