



Northern Climate ExChange

Independent Information - Shared Understanding - Action on Climate Change

NCE Update March 16, 2011



Article Headlines:

- 1. In Arctic, climate change threats include giardia, food poisoning**
- 2. Shrinking tundra, advancing forests: how the Arctic will look by century's end**
- 3. Canada's Arctic, a hotspot for earthquakes**
- 4. Shifting spring: Arctic plankton blooming up to 50 days earlier now**
- 5. Arctic on verge of record ozone loss**
- 6. Water for an integrative climate paradigm**

Quick Links

[NCE Website](#)
[What's New](#)
[About NCE](#)
[Climate Change North Website](#)
[Impacts & Adaptation](#)

Distribution List

[Join Our Mailing List!](#)

Announcements

1. Conservation Science North of 60 - In the North, For the North

In collaboration with the University of Alberta, Yukon College now offers a Bachelor of Science (BSc) degree in Environmental and Conservation Sciences (ENCS), with strong northern and native studies content. For returning professionals, aspiring youth and those seeking a new direction, the program offers a variety of options and entry points.

Information sessions are available to learn more about the BSc Program and September 2011 admissions:

- Thursday March 24th, Yukon College, Whitehorse (Ayamdigut), A2103, 12:00-1:00 p.m.
- Wednesday March 30th, Yukon College, Whitehorse (Ayamdigut), A2103, 5:00-7:00 p.m.
- Thursday March 31st, community campuses via videoconference (please contact your Yukon College community campus for information on how to participate), 12:00-1:00 pm.
- Wednesday April 6th, community campuses via videoconference (please contact your Yukon College community campus for information on how to participate), 5:00-6:00 p.m.

For more information, contact [Lisa Christensen](#), Coordinator, Northern ENCS Program, Yukon College, ph: 867-668-8726.



2. Pacific Institute of Climate Solutions Seminar on The Psychology of Climate Change

By Dr. Sabine Pahl, Lecturer in Psychology, University of Plymouth, UK
When: 10:45 am - 11:45 am | Tuesday, March 22, 2011

A live webcast will be available at www.pics.uvic.ca/broadcast.php



WELCOME!
WHITEHORSE
GREEN GUIDE
2010-11

Articles

1. In Arctic, climate-change threats include giardia, food poisoning

By Alex DeMarban
The Arctic Sounder
March 2, 2011

Melting ice cellars that threaten to caused food poisoning as whale meat rots. The first recorded case of giardia, just as beavers show up for the first time. Algae blooms and melting river banks that contaminate water systems.

Climate change presents new risks for food care, sanitation and wellbeing in the Arctic, but little research has been done in remote villages experiencing some of the biggest temperature swings.

That's beginning to change, thanks to a [pair of reports](#) that meld scientific data with local observations in the Northwest Alaska communities of Point Hope and Kivalina.

The Alaska Native Tribal Health Consortium plans to release assessments of other villages by the end of the year, giving researchers the first comprehensive look at the impact of climate change on the region's health. A review of Noatak village is next. The information is already being used to combat new challenges, said Michael Brubaker, lead researcher and director of the health consortium's Center for Climate and Health.

For example, one follow-up project will create local climate-change observers who provide regular reports. And new research is underway in hopes of better understanding why giardia has recently emerged in some communities.

"These reports mostly identify potential problems related to climate," Brubaker said. "Hopefully by illuminating that, the research community can partner with local leadership and come up with specific responses."

The village assessments are funded with a \$250,000 Indian Health Service grant, and include input from the Northwest Arctic Borough and the Maniilaq Association, the region's tribally run social service organization. The communities to be assessed fall under Maniilaq's service area, but the health consortium doesn't have the money to review all 12 communities. Researchers plan to produce a good sampling of coastal and upriver communities in the region, and they're working with representatives from all the communities through webinars and regional conferences, Brubaker said.

Some good news

With Alaska on the leading edge of climate change, temperatures in recent decades have increased dramatically in the two Inupiat villages situated northwest of Kotzebue beside the Chukchi Sea.

Overall, the Northwest Arctic saw average December and January temperatures increase seven degrees between 1949 and 2006. In another 50 years, Point Hope's average December temperatures could rise as much as 22 degrees, the study notes.

The results won't be all bad.

New salmon species are beginning to populate rivers for the first time, creating an important new subsistence opportunity. The indoor flu season should shrink as people leave the house on warmer days. And there might be more economic opportunity, such as commercial fishing. But the reports cover a litany of concerns.

Some important topics: Clean water and sanitation

In Kivalina, a village of 400, river banks crumble continuously during the warm season, flooding the water system with sediment and requiring extra filtering and expense. The health consortium found a relationship between collapsing river banks and "turbidity events" -periods of cloudy water -at the water plant, said Brubaker.

And in 2004 in Kivalina, erosion and late freeze-up damaged the washeteria's leach field system. The washeteria's an important site where people collect treated water, wash clothes and take showers. It shut down for the winter. At that point, residents were "back on sponge-bath status, except for the school," the only other building with tap water, said Brubaker.

The lack of access to treated water in the winter made hand-washing and bathing more difficult. Health aides reported more respiratory and skin diseases during the shut-down, the report said.

The health consortium has requested a follow-up study, and the Centers for Disease Control and Maniilaq are now reviewing clinical records to see if the data supports those observations, Brubaker said.

As for the water system in Point Hope, a village of 700, algae blooms are an increasing problem in the lake that provides the village's water. Algae appeared with warm water temperatures in the summer of 2007 and 2008, forcing technicians to clean filters dozens of times daily. Sometimes, they spent several hours a day fighting algae. That's doesn't just increase the utility's costs. It's also a water safety issue, because Arctic villages have a limited time to treat water before rivers and lakes freeze, Brubaker said.

More beavers

The Wulik River watershed that provides Kivalina its water is home to increasing numbers of wood-chewing beavers, as longer growing seasons have helped alders and willows grow from shrubs into trees.

Meanwhile, health officials are increasingly worried about giardia, an intestinal infection known as beaver fever, which was first recorded at the local clinic 2006. Other animals could be to blame, but researchers are eyeing the beavers, and suspect the sick person drank untreated river water.

That's a landmark change for an area with once-pristine creeks and rivers, said Brubaker.

"In general, people could drink from them freely," he said. "Now they have beavers defecating into the river, and that raises the risk of giardia." The emerging disease could be a big problem in an area where many people prefer to get their water from lakes and rivers in part because it's cheaper, he said.

The report cautions residents to make sure they boil or treat water from the wilderness, Brubaker said. Health aides have also been notified to warn others and to look for giardia symptoms in patients. The region has experienced a small number of other giardia cases, according to state records. Researchers want to know more about each case, including where the individual lived when they got sick, Brubaker said.

Less marine mammal harvests

Another big problem, especially in Point Hope: Ice cellars carved from the permafrost, which once stayed frozen year-round, are melting in spring and filling with water.

"There's a lot of bailing going on in the ice cellars in Point Hope," said Brubaker.

The odor has apparently drawn polar bears close to town -some have clawed through thawed ground and into the cellar -presenting an important safety concern. The warmer cellars could also cause contaminated meat and lead to more stomach infections from botulism, salmonella, and e-coli, the report notes.

"The ocean is coming and eroding the beach, real fast. Some of the cellars are all gone-maybe a mile out, just eroded," Joe Towksjhea of Point Hope is quoted as saying in the report. To learn more, scientists with the University of Alaska Fairbanks and the U.S. Geological Survey have installed sensors to better assess the warming temperature in ice cellars and in Point Hope's water lake, Brubaker said.

Another worry: few walrus have been harvested in Point Hope since 2006, because changing sea ice conditions may affect the animals' patterns.

Health aides report more malnutrition and anemia in Point Hope, especially in elders. They believe the drop in sea mammal harvests may be a factor, the report notes. In Kivalina, it's been more than a decade since the community harvested a bowhead whale. The study notes that in 2007, one-quarter of households reported they didn't get enough sea mammals. Residents were most likely to blame bad ice conditions.

The increased warmth has also shortened seasons for drying caribou, fish and seal before they rot. Clinical reports did not show higher amounts of foodborne illnesses in Kivalina, but residents should take care when storing and preparing wild food. "Pregnant women, infants, the elderly, and those with weakened immune systems are at higher risk for severe infections," such as those that result from eating wildlife diseased with infections, the report said.

Flooding, erosion

The reports also address climate change's better-known problems.

Both communities are subject to erosion, in part because late freeze-up leaves the coastline thawed and more vulnerable. Flooding is also a problem, and Kivalina is looking at moving and rebuilding somewhere else. One high-risk area in Point Hope includes a culturally important mass grave from early last century, where people may have been buried following an epidemic of the Spanish flu or one of the other diseases that decimated many Native communities. In both villages, ice also often isn't thick enough to support whale or walrus that need butchering. It also threatens hunters.

"On May 8, 2008, three Point Hope whaling crews were cast adrift when a huge slab of shore-fast ice broke free," that report notes.

Snow-gos have crashed through the ice in Kivalina, including three or four during one recent autumn, said Andrew Baldwin Jr., the VPSO in Kivalina, according to the study.

"Two machines were lost," Baldwin was quoted as saying.

Other studies planned

In addition to the CDC's efforts to study infectious disease rates in Kivalina, the tribal health consortium is working with other organizations to answer additional questions raised in the reports.

With the city of Kivalina, the health consortium has requested money from the state for a feasibility study that will consider improving the water and sanitation system.

A rock revetment wall built by the Army Corps of Engineers is expected to extend the village's life by another 15 to 20 years. "We can't wait around for 15 or 20 years to make sure people have adequate water and sanitation," Brubaker said.

Also, the Institute for Circumpolar Health at the University of Alaska Anchorage will also train observers to collect information about climate change. "They think these are sentinel communities for climate change," Brubaker said.

www.thearcticsouder.com

[back to top](#)

2. Shrinking tundra, advancing forests: how the Arctic will look by century's end

Physorg.com
March 3, 2011

Imagine the vast, empty tundra in Alaska and Canada giving way to trees, shrubs and plants typical of more southerly climates. Imagine similar changes in large parts of Eastern Europe, northern Asia and Scandinavia, as needle-leaf and broadleaf forests push northward into areas once unable to support them. Imagine part of Greenland's ice cover, once thought permanent, receding and leaving new tundra in its wake.

Those changes are part of a reorganization of Arctic climates anticipated to occur by the end of the 21st

century, as projected by a team of University of Nebraska-Lincoln and South Korean climatologists.

In an article to be published in a forthcoming issue of the scientific journal [Climate Dynamics](#), the research team analyzed 16 global climate models from 1950 to 2099 and combined it with more than 100 years of observational data to evaluate what climate change might mean to the Arctic's sensitive ecosystems by the dawn of the 22nd century.

The study is one of the first to apply a specific climate classification system to a comprehensive examination of climate changes throughout the Arctic by using both observations and a collection of projected future climate changes, said Song Feng, research assistant professor in UNL's School of Natural Resources and the study's lead author.

Based on the climate projections, the new study shows that the areas of the Arctic now dominated by polar and sub-polar climate types will decline and will be replaced by more temperate climates - changes that could affect a quarter to nearly half of the Arctic, depending on future greenhouse gas emission scenarios, by the year 2099.

Changes to Arctic vegetation will naturally follow shifts in the region's climates: Tundra coverage would shrink by 33 to 44 percent by the end of the century, while temperate climate types that support coniferous forests and needle-leaf trees would push northward into the breach, the study shows.

"The expansion of forest may amplify global warming, because the newly forested areas can reduce the surface reflectivity, thereby further warming the Arctic," Feng said. "The shrinkage of tundra and expansion of forest may also impact the habitat for wildlife and local residents."

Also according to the study:

- By the end of the century, the annual average surface temperature in Arctic regions is projected to increase by 5.6 to 9.5 degrees Fahrenheit, depending on the greenhouse gas emission scenarios.
- The warming, however, is not evenly distributed across the Arctic. The strongest warming in the winter (by 13 degrees Fahrenheit) will occur along the Arctic coast regions, with moderate warming (by 4 to 6 degrees Fahrenheit) along the North Atlantic rim.
- The projected redistributions of climate types differ regionally; in northern Europe and Alaska, the warming may cause more rapid expansion of temperate climate types than in other places.
- Tundra in Alaska and northern Canada would be reduced and replaced by boreal forests and shrubs by 2059. Within another 40 years, the tundra would be restricted to the northern coast and islands of the Arctic Ocean.
- The melting of snow and ice in Greenland following the warming will reduce the permanent ice cover, giving its territory up to tundra.

"The response of vegetation usually lags changes in climate. The plants don't have legs, so it takes time for plant seed dispersal, germination and establishment of seedlings," Feng said. Still, the shrub density in tundra regions has seen a rapid increase on decadal and shorter time scales, while the boreal forest expansion has seen a much slower response on century time scales. Also, increasing drought conditions may help offset any potential benefits of warmer temperatures and reduce the overall vegetation growth in the Arctic regions, Feng said.

Non-climate factors - human activity, land use changes, permafrost thawing, pest outbreaks and wildfires, for example - may also locally affect the response of vegetation to temperature warming in the Arctic.

www.physorg.com

[back to top](#)

3. Canada's Arctic, a hotspot for earthquakes

By Jane George
Nunatsiaq Online
March 12, 2011

In the aftermath of March 11's devastating earthquake and tsunami in Japan, some are already asking if there's a link between earthquakes and climate change.

In the polar regions, scientists have noted that earthquakes are on the rise, and that some of these may be associated with global warming.

That's because the pressure of glaciers suppresses earthquakes, so when this ice melts, the pressure release can trigger earthquakes in a movement known as postglacial rebound.

Over the past 80 years, about 2,000 earthquakes have been recorded in Nunavut.

Most are of these have been minor, falling below a magnitude of 4.0 on the Richter scale. These light earthquakes may make a low rumbling noise, but they produce little movement of the ground.

On April 3, 1999 - three days after the creation of the territory, Nunavut saw its first ever earthquake, according to Natural Resources Canada. It wasn't the first in the territory, but it was the first recorded earthquake after Nunavut officially became Canada's newest territory.

The last earthquake, which was actually felt in Nunavut, occurred on Dec. 4, 2010, 137 kilometres north of Baker Lake.

The force of this Dec. 4 quake was of a magnitude of 4.6 on the Richter scale that's used to measure the force of earthquakes - much less than Friday's jolt of a 8.9 magnitude off Japan.

But Nunavut and northern Nunavik, where a 2006 earthquake of 4.0 magnitude shook Puvirnituk, are among the most earthquake-prone zones in Canada.

According to data gathered by the Geological Survey of Canada, the northeast coast of Baffin Island and the High Arctic islands have a particularly high incidence of earthquakes.

This past month saw 17 light earthquakes in Nunavut - and, since the beginning of the year, there have been about 40 earthquakes, including three near Salluit, according to data from Natural Resources Canada.

In nearby Greenland, the annual number of glacial earthquakes is rising, a study from 2006 shows.

From 1993 to 2002, there were between six and 15 a year, but in 2003, earthquake scientists - or seismologists - who track the movements of the earth, recorded 20 glacial earthquakes; in 2004, they recorded 24; and, for the first 10 months of 2005, they recorded 32.

The seismologists also found that the earthquakes occurred mainly during the summer months, which suggested these movements were associated with rapidly melting ice.

In the past, there have been strong earthquakes recorded in Canada's North.

On Nov. 20, 1933, a monster earthquake ripped through the sea-floor of Baffin Bay, not far offshore from Pond Inlet. Seismologists believe its magnitude measured 7.3 on the Richter scale. A quake that powerful can hurl people to the ground, shake buildings apart, set off landslides and trigger giant tidal waves, as was seen in Japan.

In 1989, on Nunavik's Ungava peninsula, an earthquake of 6.3 magnitude tore open the tundra and shook up surrounding communities. The earthquake shattered stone, partially drained one lake, and created a new lake where none had existed before.

So, can we expect to see more earthquakes in Canada's Arctic? Yes, said Bill McGuire in a 2006 article in the New Scientist, called "Climate change: Tearing the Earth apart?"

"Dumping the weight of a kilometer-thick ice sheet onto a continent or removing a deep column of water from the ocean floor will inevitably affect the stresses and strains on the underlying rock," he said. "[While] not every volcanic eruption and earthquake in the years to come will have a climate-change link... [But as] the century progresses we should not be surprised by more geological disasters as a direct and indirect result of dramatic changes to our environment."

You can see if the ground is moving in Nunavut, by checking out the [Natural Resources Canada website](#).

www.nunatsiagonline.ca

[back to top](#)

4. Shifting spring: Arctic plankton blooming up to 50 days earlier now

By Brian Vastag
Washington Post Staff Writer
March 6, 2011

Climate researchers have long warned that the Arctic is particularly vulnerable to global warming. The dramatic shrinking of sea ice in areas circling the North Pole highlights those concerns.

A new report finds that the disappearing ice has apparently triggered another dramatic event - one that could disrupt the entire ecosystem of fish, shellfish, birds, and marine mammals that thrive in the harsh northern climate.

Each summer, an explosion of tiny ocean-dwelling plants and algae, called phytoplankton, anchors the Arctic food web.

But these vital annual blooms of phytoplankton are now peaking up to 50 days earlier than they did just 14 years ago, satellite data show.

"The ice is retreating earlier in the Arctic, and the phytoplankton blooms are also starting earlier," said study leader Mati Kahru, an oceanographer at the [Scripps Institution of Oceanography](#) in San Diego.

Drawing on observations from three American and European climate satellites, Kahru and his international team studied worldwide phytoplankton blooms from 1997 through 2009. The satellites can spot the blooms by their color, as billions of the tiny organisms turn huge swaths of the ocean green for a week or two.

The blooms peaked earlier and earlier in 11 percent of the areas where Kahru's team was able to collect good data. Kahru said the impacted zones cover roughly 1 million square kilometers, including portions of the Foxe Basin and the Baffin Sea, which belong to Canada, and the Kara Sea north of Russia.

In the late 1990s, phytoplankton blooms in these areas hit their peak in September, only after a summer's worth of relative warmth had melted the edges of the polar ice cap. But by 2009 the blooms' peaks had shifted to early July.

"The trend is obvious and significant, and in my mind there is no doubt it is related to the retreat of the ice," said Kahru, who published the work in the journal *Global Change Biology*.

"A 50-day shift is a big shift," said plankton researcher Michael Behrenfeld of Oregon State University, who was not involved in the study. "As the planet warms, the threat is that these changes seen closer to land may spread across the entire Arctic."

Ecologists worry that the early blooms could unravel the region's ecosystem and "lead to crashes of the food web," said William Sydeman, who studies ocean ecology as president of the nonprofit Farallon Institute in Petaluma, Calif.

When phytoplankton explode in population during the blooms, tiny animals called zooplankton - which include krill and other small crustaceans - likewise expand in number as they harvest the phytoplankton. Fish, shellfish and whales feed on the zooplankton, seabirds snatch the fish and shellfish, and polar bears and seals subsist on those species.

The timing of this sequential harvest is programmed into the reproductive cycles of many animals, Sydeman said. "It's all about when food is available." So the disrupted phytoplankton blooms could "have cascading effects up the food web all the way to marine mammals."

But the Arctic food web is poorly studied, and so any resulting decline in fish, seabirds and mammals will be difficult to spot.

As the Arctic Ocean north becomes less and less icy, commercial fisherman have begun eyeing these vast, untapped waters as an adjunct to the famously rich fishing grounds of the subarctic Bering Sea, west of

Alaska.

But in 2009, the U.S. body overseeing fishing in the region, the North Pacific Fishery Management Council, banned commercial fishing in the Arctic Ocean, citing a lack of knowledge about how many - or even what kind - of fish live there.

"There are no catches authorized because we don't know enough about the fish populations there to set a quota," said Julie Speegle, a spokeswoman for the Alaska office of the National Marine Fisheries Service.

Last week, that service reported results from the [first fish survey](#) in 30 years of the Beaufort Sea, an arm of the Arctic Ocean north of Alaska. The survey found sizeable populations of several commercially valuable species, including pollock, Pacific cod, and snow crab.

How these populations will respond to the ever-earlier plankton blooms is a big unknown, Sydeman said. But other research has shown that northern Atlantic cod populations crash when plankton blooms in that region shift in time.

Last week, the [National Snow and Ice Data Center](#), in Boulder, Colo., reported that in February, Arctic sea ice covered a smaller area than ever seen in that month, tying with February 2005 as the most ice-free February since satellites began tracking Arctic ice in 1979. The annual average Arctic sea ice coverage has decreased about 12 percent since then, a trend that appears to be accelerating, said Walt Meier, a research scientist at the center. Summer ice coverage has declined even more dramatically, he said, with the Arctic losing almost a third of its late-summer ice over the past 30 years.

www.washingtonpost.com

[back to top](#)

5. Arctic on verge of record ozone loss

ScienceDaily
March 14, 2011

Unusually low temperatures in the Arctic ozone layer have recently initiated massive ozone depletion. The Arctic appears to be heading for a record loss of this trace gas that protects Earth's surface against ultraviolet radiation from the sun. This result has been found by measurements carried out by an international network of over 30 ozone sounding stations spread all over the Arctic and Subarctic and coordinated by the Potsdam Research Unit of the Alfred Wegener Institute for Polar and Marine Research in the Helmholtz Association (AWI) in Germany.

"Our measurements show that at the relevant altitudes about half of the ozone that was present above the Arctic has been destroyed over the past weeks," says AWI researcher Markus Rex, describing the current situation. "Since the conditions leading to this unusually rapid ozone depletion continue to prevail, we expect further depletion to occur." The changes observed at present may also have an impact outside the thinly populated Arctic. Air masses exposed to ozone loss above the Arctic tend to drift southwards later. Hence, due to reduced UV protection by the severely thinned ozone layer, episodes of high UV intensity may also occur in middle latitudes. "Special attention should thus be devoted to sufficient UV protection in spring this year," recommends Rex.

Ozone is lost when breakdown products of anthropogenic chlorofluorocarbons (CFCs) are turned into aggressive, ozone destroying substances during exposure to extremely cold conditions. For several years now scientists have pointed to a connection between ozone loss and climate change, and particularly to the fact that in the Arctic stratosphere at about 20km altitude, where the ozone layer is, the coldest winters seem to have been getting colder and leading to larger ozone losses. "The current winter is a continuation of this development, which may indeed be connected to global warming," atmosphere researcher Rex explains the connection that appears paradoxical only at first glance. "To put it in a simplified manner, increasing greenhouse gas concentrations retain Earth's thermal radiation at lower layers of the atmosphere, thus heating up these layers. Less of the heat radiation reaches the stratosphere, intensifying the cooling effect there." This cooling takes place in the ozone layer and can contribute to larger ozone depletion.

"However, the complicated details of the interactions between the ozone layer and climate change haven't been completely understood yet and are the subject of current research projects," states Rex. The European

Union finances this work in the RECONCILE project, a research programme supported with 3.5 million euros in which 16 research institutions from eight European countries are working towards improved understanding of the Arctic ozone layer.

In the long term the ozone layer will recover thanks to extensive environmental policy measures enacted for its protection. This winter's likely record-breaking ozone loss does not alter this expectation. "By virtue of the long-term effect of the Montreal Protocol, significant ozone destruction will no longer occur during the second half of this century," explains Rex. The Montreal Protocol is an international treaty adopted under the UN umbrella in 1987 to protect the ozone layer and for all practical purposes bans the production of ozone-depleting chlorofluorocarbons (CFCs) worldwide today. CFCs released during prior decades however, will not vanish from the atmosphere until many decades from now. Until that time the fate of the Arctic ozone layer essentially depends on the temperature in the stratosphere at an altitude of around 20 km and is thus linked to the development of earth's climate.

www.sciencedaily.com

[back to top](#)

6. Water for an integrative climate paradigm

ScienceDaily
March 14, 2011

International climate negotiations are deadlocked between the affluent global North and "developing" South, between political Left and Right, and between believers and deniers. Now, authors writing in the latest issue of the International Journal of Water argue that a more integrative analysis of climate should help resolve these conflicts.

Land use changes and water management are highly relevant to climate change. To quote hydrologists Juraj Kohutiar and Michal Kravcik of the Slovak People and Water NGO: "Water evaporation is the most important agent of energy transformation on Earth." Unfortunately, some parts of the media simply play the crisis as a highly antagonistic two-headed controversy between Position 1 -- human impacts on climate are negligible, and Position 2 -- human impacts are significant and a result of carbon dioxide emissions. This has done little for public understanding and has been exploited by others with political and economic agendas.

The Editor of the IJW special issue, "Water and the Complexities of Climate," Ariel Salleh, environmental sociologist from the University of Sydney, says that public eco-literacy is critical to good climate policy formulation. "Overly simplified climate models are one thing, but governments are proffering economic solutions (like taxes or trading) for ecological problems! This can achieve little on the ground -- since economics and ecology deal with two different orders of reality."

Given the political uproar of international climate summits including Copenhagen and Cancun, attention has been deflected from a third variety of scientific opinion -- Position 3 -- the integrative climate paradigm. This recognizes a range of first-order climate forcings and human-induced causes as significant as carbon dioxide emissions, such as deforestation, agro-industry, and urbanization.

United Nations climate negotiations promote programs such as the Clean Development Mechanism, where forests in the global South are treated as passive carbon sinks for pollution from industrialized countries in the global North. However, what is commonly overlooked is the fact that intact vegetation actively manages the small water cycle, and cools Earth by converting sensible heat to the latent heat of evaporation.

This thesis is amplified by authors in the IJW special issue. Wilhelm Rippl from the Technical University of Berlin connects mismanagement of water with the running down of ecosystems and thus global warming. Russian physicists Makarieva and Gorshkov argue for closer attention to the climate-regulating effects of forest-ocean interactions. A Czech scientific team led by Jan Pokorný assesses the efficacy of 'Solar energy dissipation and temperature control by water and plants'.

In Pokorný's words: "Ecosystems use solar energy for self-organization and cool themselves by exporting entropy to the atmosphere as heat. These energy transformations are achieved through evapo-transpiration, with plants as 'heat valves' ... While global warming is commonly attributed to atmospheric CO₂, the research shows water vapor has a concentration two orders of magnitude higher than other greenhouse gases."

Wider implications of the integrative climate model are explored by Schmidt in urban planning. Norris, Andrews and Williams demonstrate the principles in agriculture. Hesslerova and Pokorny show how warming and rainfall loss follow "development" projects that clear fell forests and engineer drainage. Australian political scientist James Goodman and activist Ellen Roberts expose the social costs on poor communities imposed by what they see as "badly conceived UN climate policies" such as the REDD scheme -- Reducing Emissions from Deforestation and Forest Degradation.

A final paper by Lodemann and colleagues is written from the viewpoint of environmental ethics. As Salleh notes: "The challenge is to achieve a climate politics that is at once responsive to local conditions, ecologically effective, socially democratic, and globally just."

www.sciencedaily.com

[back to top](#)

NCE Update Subscribers,

For comments, or to submit content you would like considered for inclusion in the NCE Update, e-mail us at: [NCE Update](#).

Northern Climate ExChange

[back to top](#)

*The NCE Update is currently being published bi-weekly. The next Update from the Northern Climate ExChange will be sent out **Wednesday, March 30th 2011***