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Big changes predicted in Alaska climate by 2100

by Molly Rettig / mrettig@newsminer.com

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FAIRBANKS — More than half the ecosystems in Alaska will look much different by the end of the century, according to a new study at the University of Alaska Fairbanks. Changes in climate could alter the habitat of many species of plants and animals, skewing their range and population across Alaska.

The study predicted potential outcomes, such as the end of the Alaska marmot and an invasion of reed canary grass across much of the state. More than half the coast of western Alaska could change from tundra into something like western British Columbia. And by 2100, the climate in the Interior might resemble the Mat-Su climate today.

“The most interesting thing is to realize how much potential change we might see in Alaska within our own lifetimes,” said Nancy Fresco, an ecologist at Scenarios Network for Alaska Planning at the University of Alaska Fairbanks. Fellow researchers were the U.S. Fish & Wildlife Service and the Ecological Wildlife Habitat Data Analysis for the Land and Seascape.

“We’re kind of at the cutting edge of climate change, and the effects are exaggerated in the Far North and the Arctic,” she said.

The study is geared toward land managers who are trying to conserve or control wildlife populations. These species need more than pockets of food and shelter; they also require connections to the habitats they use. Changes in one ecosystem can make entire regions inaccessible to certain species or skew the ranges of others.

Researchers picked four species — caribou, Alaska marmot, trumpeter swans and reed canary grass — with different sensitivities to climate change. Caribou, for instance, are highly adaptable and have few migration constraints. Though their range is expected to shrink and move northeast, researchers think they will adapt to new habitat just as they have in the past.

Alaska marmots, on the other hand, live in rocky alpine areas like the scree fields of the Brooks Range. In winter, they hunker into dens. Their habitat is likely to shrink 87 percent by 2099.

“As things get warmer, essentially the warmth is forced upslope,” Fresco said. “And the tops of mountains are smaller than sides of mountains.”

Trumpeter swans, which require 138 ice-free days to fledge their young, could benefit from longer summer seasons.

“It looked as if the potential habitat of trumpeter swans might expand,” Fresco said.

Local and state effects

As with the animal kingdom, some parts of Alaska will be affected more than others. The Interior shouldn’t experience radical changes.

“There will probably continue to be trumpeter swans. We don’t have the grass here now, but we might start seeing it,” Fresco said.

Fairbanks also could become more attractive to pests like the spruce bark beetle, which chewed through the Kenai Peninsula earlier this decade.

“If we start to lose our negative-40s or negative-50s, not only are we looking at potential changes in vegetation and ecosystem and habitat, we’re looking at becoming much more welcoming to invasive species,” she said.

The Arctic and the Northwestern boreal regions are predicted to shrink by nearly 70 percent and be replaced by new ecosystems. Less than 2 percent of the western tundra could remain unchanged — even without sea level rise expected from melting ice.

“The most surprising thing was actually thinking about western coastal Alaska and how uncertain the ecosystem may be,” Fresco said.

Weather data

Researchers input temperature and precipitation numbers from June and December into climate models to generate future climate data. The models are based on how much carbon likely will be in the atmosphere in future years (using cautiously optimistic levels).

They gathered habitat information on caribou, swans and marmots from scientific field surveys.

Still, the report gives potential — not certain — outcomes.

Models are not perfect predictors of animal behavior because they ignore factors such as competition, food supply and human interaction, said Karen Murphy of Fish and Wildlife Service.

“Models should always be looked at as tools to help people envision what the future may be like, rather than as reality,” she said.

It’s also hard to predict how long it will take for different species to react to climate changes.

“Something like a caribou or swan could pick up and move immediately because they’re migratory, whereas spruce trees have long life cycles and their seeds can’t disperse that far, ” Fresco said.

The future

Many other factors could be included in the study, such as melting permafrost, sea level rise and wildfire, Murphy said. Other colonies and species also could be added. This study is merely the first layer in painting a picture of the future, and researchers hope that scientists and indigenous communities will add more color and detail.

It reminds everyone in Alaska that the trees, plants or wildlife around them are subject to change, Fresco said.

“The species they enjoy hunting or fishing or watching may not be here for their kids, but a different species may be,” she said.

Contact staff writer Molly Rettig at 459-7590.

For the full report, titled “Connecting Alaska Landscapes into the Future,” visit <http://www.snap.uaf.edu/downloads/connecting-alaska-landscapes-future>.

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« [AlaskaBorn](#) wrote on Tuesday, Oct 19 at 02:06 PM »

1. Why is it so hard to have a civil discussion on this issue? Are the AGW cultists a bit sensitized?

ravinshinn insulted the Palins and the Millers

LostAlaskan99712 called those with contrary opinions "six pack scientists"

Skinfish used the derogatory term "tea baggers", corrupting the memory of courageous American actions prior to the Revolutionary war.

sosorry calls those with contrary opinions "dumbass"

2. There is nothing like a consensus in the scientific community regarding this issue, which is contrary to what we will hear from President Obama and the United Nations. The President and the UN would however like to raise the cost of fossil fuels, increasing the cost of heating your homes, driving your car, the cost of your electricity and the cost to manufacture and transport goods. See "cap and trade" "emissions trading" and "Kyoto accords". BTW, although a great resource, be aware that Wikipedia displays a pro AGW stance.

3. To those of you who feel that lessening our emissions is a worthy effort, independent of its impact on AGW, be aware that the methods that will be implemented will have a lasting effect on our country's personal freedoms and chip away at our hard won and defended rights. I believe that we must be the best stewards of our natural resources, while we continue to strengthen the country we will pass to our descendants.

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« [Gerhard_Kramm](#) wrote on Tuesday, Oct 19 at 01:27 PM »

@anyoneoutthere,

The statistical results regarding the climate of Alaska were published by Gerd Wendler, the Director of the Alaska Climate Research Center, and his collaborators. I checked these results when I gave a presentation before the Joint Alaska Climate Impact Assessment Commission in April 2007.

My research field is theoretical meteorology. Thus, I am able to evaluate theoretical concepts used, for instance, by the IPCC. Most of these concepts have no physical bases.

Until today there is no scientific evidence that the CO₂-temperature hypothesis is true.

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« [Assistant_DA](#) wrote on Monday, Oct 18 at 11:39 PM »

Does anyone out there really think we have a chance at stopping climate change? Even if we shut down down all the polluting industries in the U.S., will that stop it? If Europe did the same...? I think not. you still have India and China, to name 2 countries, creating obscene amounts of pollutants. I seriously doubt the greenies are going to make them stop. Instead of taxing the crap out of us and wasting all that money trying to stop global warming, we should try to figure out how we will live with a warmer climate. <http://www.youtube.com/watch?v=HIULIJxVr7A&feature=fvsr>

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« [childofsol](#) wrote on Monday, Oct 18 at 10:04 PM »

Good comments, sosorry.

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« [sosorry](#) wrote on Monday, Oct 18 at 09:57 PM »

Predicting the future is one of the useful outcomes of an evolved brain. When you don't have heavy fur

or a thick hide or natural built in defenses having that calculating brain can make a huge difference in the survival of humanity.

Observing natural cycles and events and the changes that are happening is simply being practical and human. In more traditional cultures, being able to prepare the people for future disasters is considered to be wise and the people who do it well are said to have wisdom.

There is no question that up here things have changed rapidly in the last 50 years. I see it gaining momentum as things will when they get going, seems like everything begins to feed it.

We are in the beginning of it where things still have a lot of resistance but not enough to stop it. What happens up here in the North country will

be the real driver for change. I don't need complex computer modelling to know that my skin burns faster in the sun now up in Prudhoe and that summers are a lot longer and warmer and winters are milder. Here of course we know it easy enough

a cold snap now is nothing compared to in the 70's

and before.

Wisdom says do your best to figure out what is going on and prepare.

Dumbass says ignore it and throw insults at the people who are saying hey something is not right here and it is going to have catastrophic consequences.

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« [anyoneoutthere](#) wrote on Monday, Oct 18 at 09:17 PM »

The only "new" stuff entering Earths atmosphere is energy from the sun. All the rest has been here since it was created.

Lots of really useful stuff, like medicine, is made from petroleum. If we burn all the petroleum in our vehicles, we doom the future from having those products.

What if these crazy scientists are correct?? And we cause catastrophic global climate change? Wouldn't it be wise to hedge our bet and try to change the supposed course. Rather than bury our heads in the collective sand like ostriches.

How many of you believe in God, just in case??

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« [AlaskaBorn](#) wrote on Monday, Oct 18 at 08:42 PM »

deepbreathnow

If we reduce pollution it won't be for "no reason". It will be done to reallocate wealth, a concept dear to the progressive movement. It will also make Al Gore even wealthier than he is now.

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« [ktlm](#) wrote on Monday, Oct 18 at 08:10 PM »

photo: yes and the only way to save the future of the earth is through taxes and gov't control. That alone should open some eyes but people just can't see past their educated brainwashed minds.

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« [Photodude705](#) wrote on Monday, Oct 18 at 07:38 PM »

So let me get this straight... They can't tell me what the weather will be next week, next month or next year, but they're going to tell me what's going to happen in 90 years?

Yea, right.

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« [1AhHa](#) wrote on Monday, Oct 18 at 07:31 PM »

I must say I enjoy global warming.

Yea, though I walk through the valley of scientific balderdash;

– I pray for a warmer climate;

I shall fear no study;

for I know-ith 40 below zero be with me through the rest of my days;

and none of the forecaster's will be here 100 years from now.

--

Weather prognosticators are lucky to predict the weather one day in advance --- does anyone seriously think they can the weather 100 years from now?

And, you all should use your computer for something useful: predict tomorrow's closing DOW.

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« [deepbreathnow](#) wrote on Monday, Oct 18 at 07:20 PM »

What if global warming is a hoax, and we end up reducing pollution for nothing?

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« [Skinfish](#) wrote on Monday, Oct 18 at 06:50 PM »

If we ignore global warming it will go away, Sarah and the tea baggers told me so.

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« [anyoneoutthere](#) wrote on Monday, Oct 18 at 06:02 PM »

Gerhard_Kramm To answer your post. You have apparently done a lot of research.

I have to admit that I have drawn my conclusions from personal experience in the interior.

We no longer have prolonged periods of really cold weather. Many of the longtime Fairbanks residents agree that weeks of minus 60F no longer occur.

I burn wood and spend lots of time looking at the trees in the interior. Birch, white spruce, tamarack, and aspen are all under siege from insect pests. The biologists tell me that pests are gaining ground because the winters are not cold enough to kill them.

Ice cores from Greenland and Antarctica have been analyzed and show that present concentrations of carbon dioxide exceed historical concentrations. Carbon dioxide is a green house gas.

You will conclude that I am a nut job and that is your right. I would like people to think about the future generations, some will be direct descendants.

We could consume less and leave the place better with very little effort.

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« [eddiefreddie](#) wrote on Monday, Oct 18 at 05:46 PM »

Well they say that's just normal contrails , not geo-engineering spraying of the tanker jets drawing checker boards across our skies. What I typed can all be proven 100% with minimal research.

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« [AlaskaBorn](#) wrote on Monday, Oct 18 at 04:58 PM »

Riiight....

You forgot the emissions from the UFO's...

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« [eddiefreddie](#) wrote on Monday, Oct 18 at 04:56 PM »

There should be no mystery about a cause of your warming, and it is man made. There was an article here recently stating how researchers were using giant heaters to warm alaska for testing purposes. Then too is the HAARP system in Gakona, which heats the atmosphere and makes holes in the ozone layer. One more culprit is the nuclear weapons testing on your islands. These are factual causes , of course maybe classified above your colleges pay grade.

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« [seahtoou](#) wrote on Monday, Oct 18 at 04:26 PM »

anyoneoutthere

You state: "The weather is changing and it is warming, no matter the cause."

How do you know future temperature trend if you don't know the cause for it?

Who paid for this study? The taxpayers?

----- Researchers input temperature and precipitation numbers from June and December into climate models to generate future climate data -----

GIGO = Garbage in garbage out

----"The most interesting thing is to realize how much potential change we might see in Alaska within our own lifetimes," said Nancy Fresco, an ecologist at Scenarios Network for Alaska Planning at the University of Alaska Fairbanks. Fellow researchers were the U.S. Fish & Wildlife Service and the Ecological

Wildlife Habitat Data Analysis for the Land and Seascape.---

Changes could just as well be cooling as warming. The models these folks use probably assume a much greater sensitivity (by a factor of six or more) of temperature to increased CO₂ than is correct, including positive feedback with respect to water vapor, which is probably incorrect:

From <http://www.leif.org/EOS/2009GL039628-pip.pdf>

'These feedbacks arise from the dependence of radiatively important substances like water vapor (which is a powerful greenhouse gas) and clouds (which are important for both infrared and visible radiation) on the temperature. If the feedbacks are positive, then both the equilibrium warming and the response time will increase; if they are negative, both will decrease.' Analysis of 16 years of ERBE data indicated negative feedback parameter, $f = -1.1$, which would correspond to approximately 0.5 degree K temperature increase for a doubling of atmospheric CO₂. This result contradicts climate model runs, which indicate positive feedback and goes against analysis based on observation. '

-----The study predicted potential outcomes, such as the end of the Alaska marmot and an invasion of reed canary grass across much of the state. More than half the coast of western Alaska could change from tundra into something like western British Columbia. And by 2100, the climate in the Interior might resemble the Mat-Su climate today.

"The most interesting thing is to realize how much potential change we might see in Alaska within our own lifetimes," said Nancy Fresco, an ecologist at Scenarios Network for Alaska Planning at the University of Alaska Fairbanks. Fellow researchers were the U.S. Fish & Wildlife Service and the Ecological Wildlife Habitat Data Analysis for the Land and Seascape. ---

From <http://arxiv.org/ftp/arxiv/papers/0809/0809.3762.pdf> "the most convenient means whereby nominal scientists can support global warming alarm: namely, the matter of impacts. Here, scientists who generally have no knowledge of climate physics at all, are supported to assume the worst projections of global warming and imaginatively suggest the implications of such warming for whatever field they happen to be working in. This has led to the bizarre claims that global warming will contribute to kidney stones, obesity, cockroaches, noxious weeds, sexual imbalance in fish, etc. The scientists who participate in such exercises quite naturally are supportive of the catastrophic global warming hypothesis despite their ignorance of the underlying science¹⁸."

-----"We're kind of at the cutting edge of climate change, and the effects are exaggerated in the Far North and the Arctic," she said. -----

This is like being at the cutting edge of a rat tale file, especially if garbage in garbage out computer models providing the output. From http://icecap.us/index.php/go/joes-blog/the_mathematics_of_global_warming/ 'There is neither an El Nino sequence nor any Pacific Decadal Oscillation that replicates the recent past; yet these are critical modes of variability that affect Pacific rim countries and beyond. In the whistleblower emails Trenberth laments "The fact is that we can't account for the lack of warming at the moment" - this "moment" is in its second decade-"and it is a travesty that we can't.' '

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« [Gerhard_Kramm](#) wrote on Monday, Oct 18 at 03:43 PM »

@anyoneoutthere,

you stated:

"This article is about a study of modeling of the effects of a trend that is now fact. The weather is changing and it is warming, no matter the cause. Science is in the business of viewing phenomenon and studying the possible results."

Your statements are, clearly, not true.

First, what kind of trend can be modeled with General Circulation Models (GCMs)? In climate modeling the simulation of boundary conditions is extremely important. Kramm and Dlugi (2009, see <http://arxiv.org/abs/0911.2286>) stated in their report that the inherent uncertainty prevents that climate is predictable with a sufficient degree of accuracy.

Climate modeling has nothing to do with science. This is speculation with numerical models the most stupid form of speculation.

Secondly, my colleagues Wendler and Shulski (2009) published a paper on the climate of Fairbanks (see <http://climate.gi.alaska.edu/papers/Arctic62-3-295.pdf>). In this paper it is shown that the mean annual temperature slightly decreases during the last 30 years. This is valid for all areas in Alaska with exception of the northslope where a slight increase is recorded (see Hartmann and Wendler, 2005, <http://climate.gi.alaska.edu/ResearchProjects/pages/AKpaper10.html>). Before the temperature jump of 1976 related to a change in the Pacific Decadal Oscillation (PDO) index from mainly negative to mainly positive values, there was a slight decrease in the mean annual temperature for all areas in Alaska for the period from 1951 to 1975 (see Fig. 5 in the paper of Hartmann and Wendler, 2005). Note that Gerd Wendler is the Director of the Alaska Climate Research Center at the Geophysical Institute. Martha Shulski became the Director of the High Plains Regional Climate Center in 2009.

Recently, Kramm and Dlugi (2010, <http://www.bentham.org/open/toascj/articles/V004/137TOASCJ.pdf>) showed that the so-called climate feedback equation introduced into the literature by Schneider and Mass (1975) has to be discarded because of physical reasons. In all IPCC reports this equation was used to calculate the increase of the surface temperature owing to the so-called net anthropogenic radiative forcing. If the climate feedback equation is senseless, all results based on it, are senseless, too.

In their paper Kramm and Dlugi (2010) also showed that the globally averaged energy flux balance model (Dines-type model) for the Earth-atmosphere

system, does not provide any evidence for the existence of the so-called atmospheric greenhouse effect if realistic empirical data are used.

More and more physicists like Hal Lewis recognize that the this kind of climatology is a hoax.

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« [childofsol](#) wrote on Monday, Oct 18 at 03:15 PM »

AlaskaBorn

'Crux' was a poor choice of words. Actually, the crux of his letter is that AGW is a fraud; the factual basis that he cites for this fraud is the Climategate situation. But as I stated before, Climategate did nothing to change the science of AGW.

This 'acolyte' believes in science, not personalities.

When you post a link to an article by a physics professor after talking about models being wrong, one expects to find a factual discussion of why the models are wrong. This article does not do that, nor does it contain any factual discussion of AWG.

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« [AlaskaBorn](#) wrote on Monday, Oct 18 at 02:20 PM »

Your interpretation of the professor's letter is flawed.

Hal Lewis is a scientist with a distinguished back ground (Emeritus Professor of Physics, University of California, Santa Barbara; Defense Science Board; DSB Study on Nuclear Winter; Advisory Committee on Reactor Safeguards; President's Nuclear Safety Oversight Committee; APS Study on Nuclear Reactor Safety; JASON; USAF Scientific Advisory Board; author of two books). He contends that the trillions of dollars that are being spent on "climate change" research have corrupted the scientific process. He believes that the "Independent Investigations" you place so much faith in have been corrupted as well.

I contend that AGW is a cult, and now we will hear from its acolytes.

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