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Mysterious, Glowing Clouds Appear Across America's Night Skies

By Alexis Madrigal [✉](#) July 16, 2009 | 1:00 pm | Categories: [Earth Science](#), [Space](#)



Mysterious, glowing clouds previously seen almost exclusively in Earth's polar regions have appeared in the skies over the United States and Europe over the past several days.

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Photographers and other [sky watchers in Omaha, Paris, Seattle, and other locations](#) have run outside to capture images of what scientists call noctilucent ("night shining") clouds. Formed by ice literally at the boundary where the earth's atmosphere meets space 50 miles up, they shine because they are so high that they remain lit by the sun even after our star is below the horizon.

The clouds might be beautiful, but they could portend global changes caused by global warming. Noctilucent clouds are a fundamentally new phenomenon in the temperate mid-latitude sky, and it's not clear why they've migrated down from the poles. Or why, over the last 25 years, more of them are appearing in the polar regions, too, and shining more brightly.

"That's a real concern and question," said James Russell, an atmospheric scientist at Hampton University and the principal investigator of [an ongoing NASA satellite mission](#) to study the clouds. "Why are they getting more numerous? Why are they getting brighter? Why are they appearing at lower latitudes?"

Nobody knows for sure, but most of the answers seem to point to human-caused global atmospheric change.



Noctilucent clouds were first observed in 1885 by an amateur astronomer. No observations of anything resembling noctilucent clouds before that time has ever been found. There is no lack of observations of other phenomena in the sky, so atmospheric scientists are fairly sure that the phenomenon is recent, although they are not sure why.

Over the last 125 years, scientists have learned how the clouds form. At temperatures around minus 230 degrees Fahrenheit, dust blowing up from below or falling into the atmosphere from space provides a resting spot for water vapor to condense and freeze. Right now, during the northern

hemisphere's summer, the atmosphere is heating up and expanding. At the outside edge of the atmosphere, that actually means that it's getting colder because it's pushed farther out into space.

It's not hard to see how a warming Earth could change those dynamics: as the globe heats up, the top of the atmosphere should get colder.

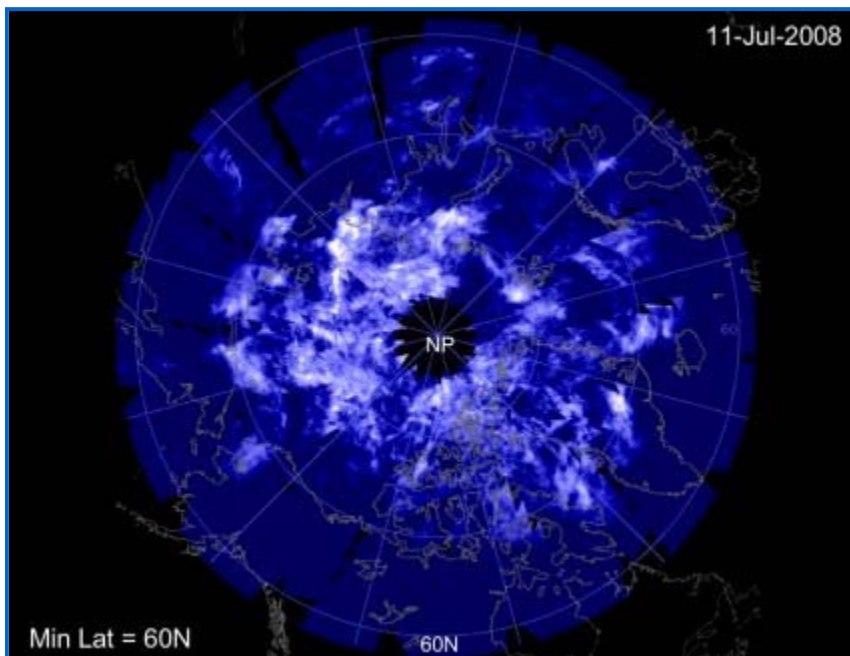
"The prevailing theory and most plausible explanation is that CO₂ buildup, at 50 miles above the surface, would cause the temperature decrease," Russell said. He cautioned, however, that temperature observations remain inconclusive.

The global changes that appear to be reshaping noctilucent cloud distribution could be much more complex, said [Vincent Wickwar](#), an atmospheric scientist at Utah State University whose team [was first to report a mid-latitude noctilucent cloud](#) in 2002. Temperature does not explain their observations from around 42 degrees latitude.

"To get the noctilucent clouds you need temperatures that are about 20 degrees Kelvin colder than what we see on average up there," Wickwar said. "We may have effects from CO₂ or methane but it would only be a degree or a fraction of a degree."

Instead, Wickwar's explanation is that a vertical [atmospheric wave](#) discovered in their [LIDAR](#) data lowered the temperature in the region above their radar installation near Logan, Utah. But then you have to ask, he noted, "Where'd the wave come from?"

They don't really have an answer yet. Other facilities around the world with similar LIDAR capacity haven't reported similar waves. And the Rocky Mountains, near Wickwar's lab, can cause atmospheric waves, which could be a special feature of his location.



Other hypotheses abound to explain the observed changes in the clouds. Human-caused increases in atmospheric methane, which oxidizes into carbon dioxide and water vapor, could be providing more

water for ice in the stratosphere. Increases in the amount of cosmic or terrestrial dust in the stratosphere could also increase the number of brightly shining clouds.

Two years into Russell's NASA project, more questions exist than firm answers. They will have at least three and a half more years, though, to gather good data on upper atmospheric dynamics.

The recent observations of noctilucent clouds at all kinds of latitudes provide an extra impetus to understand what is going on up there. Changes are occurring faster than scientists can understand their causes.

"I suspect, as many of us feel, that it is global change, but I fear we don't understand it," Wickwar said. "It's not as simple as a temperature change."

Image: 1. The sky over Omaha on July 14th, snapped by Mike Hollingshead at [Extreme Instability](#) 2. Noctilucent clouds lit up the Paris sky behind the Bastille Day fireworks show at the Eiffel Tower. Captured by flickr user, [breff](#) 3. A [rendering of the noctilucent clouds](#) created from data obtained by Russel's NASA project, AIM. Video: NASA.

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Comments (203)

Posted by: vd0nsk | 07/16/09 | 2:02 pm

Wickwar or Warwick

Posted by: slabslab99 | 07/16/09 | 2:15 pm

It's not "20 degrees Kelvin", just "20 Kelvin".

Posted by: aegipan | 07/16/09 | 2:27 pm

We noticed clouds high in the sky here in St. Petersburg, Florida last night, but assumed they were residue from the shuttle launch. They stayed bright, clear and white after the sun had gone down.

Posted by: flameproof | 07/16/09 | 2:34 pm

"Noctilucent Clouds", otherwise known as the Pretty Green Hard Sell. Buy your guilt-free-addle-brained-110%-reclaimable-oxygen-inducing-non-ozone-depleting flavored hoo-ha today!

Posted by: Pv | 07/16/09 | 3:08 pm

I saw these NE of Seattle, WA USA Wednesday 7/15 at 4am as I was driving home from a late night work binge.

They were *very* trippy looking, and at first I thought they were an Aurora (not unheard of around here), but then noticed they were moving very slowly like clouds.

Because they were moving so slowly they seemed even more nebulous and “spacey” than an aurora, as if the whole Earth were traveling through a big nebulous cloud; Very sci-fi looking.

As the run began to rise more (~4:30ish) I soon began to make out that they were indeed clouds as the horizon got lighter. I found it interesting that they appeared to recede *towards* the rising sun and eventually blended in to the true sunrise (~5:30).

I would love to see one of these again, but it is bitter sweet that they are such a beautiful sign of global warming.

Posted by: rkarlberg | 07/16/09 | 3:13 pm

Oh sure, nobody really knows, but it's probably human caused global warming. Give me a break! That's the excuse for everything now. I'm sure with huge government grants they could solve all our problems...

Posted by: photoprinter | 07/16/09 | 3:24 pm

@rkarlberg, I agree 100% Something strange in the sky, and it is ALWAYS human caused.

Posted by: jrbrfrank | 07/16/09 | 3:43 pm

aegipan, I noticed those clouds as well in Brandon, Florida last night.

Posted by: elderbear | 07/16/09 | 3:53 pm

I worked as a research engineer in upper atmospheric and ionospheric sciences for nearly 20 years (googling “elder djuth geospace” will bring up a small sampling of the work we did). During that time we collaborated with Vince Wickwar (not Warwick). During midsummer in 1998 we spent a couple weeks in northern Norway making atmospheric measurements with a powerful radar system there. During that time we observed radar soundings consistent with noctilucent clouds. There was considerable discussion about how far south we could make observations. Nobody (and we had some very good atmospheric physicists there) gave credence to the idea that they could be spotted significantly south of the arctic circle.

Seeing these clouds at mid latitudes is significant. It does not “prove” global warming, but it is strongly indicative that atmospheric dynamics are changing in unexpected ways. This is not inconsistent with global warming.

The basic physics demands that the globe will experience heating as CO2 levels increase. There are many feedback loops to mitigate the heating. But it is incumbent upon those who dismiss global warming to demonstrate that those feedback loops are sufficient to ameliorate the anthropogenic release of greenhouse gases.

Posted by: elderbear | 07/16/09 | 4:00 pm

@rkarlberg ... oh yeah, our work in Norway was funded by a "huge" government grant of around \$50K and generated several research papers. Government grants may be considered "welfare for scientists," but the world gets something for that money. During my 20 years we probably spent about \$5M of gov't grant money. This created new observation techniques, new analysis techniques, several powerful and cheap (>> 10 times cheaper than state of the art commercial at the time) hardware systems (and the the s/w to run them) which the gov't cloned and used, saving millions in taxpayer money. We also participated in medical research (included in the \$5M) creating high-frequency ultrasound that has cellular resolution, contributed to gunshot trauma care, and helped develop better AED algorithms.

Not bad for \$5M.

Posted by: hypersky75 | 07/16/09 | 4:04 pm

Glow in the dark clouds, and thick dark gooey waves (<http://www.adn.com/2835/story/864687.html>) ... 2012! 🤪

Posted by: YasirK | 07/16/09 | 4:15 pm

Wickwar's paper says that the clouds were sighted in 1995 not 2002!

Posted by: AJ | 07/16/09 | 4:15 pm

@rkarlberg

I agree with you completely. We have no idea how or why this is occurring, but we're just gonna tack on our default scapegoat: Global Warming! Does anyone even use the scientific method anymore?

Posted by: techgm | 07/16/09 | 4:31 pm

Good grief! Stop ascribing every little belch in the atmosphere, frog with 3 hind legs, and case of appendicitis to global warming.

NLCs are a well-known phenomenon, not "mysterious." That 1885 record is just the earliest known documented record (not necessarily the earliest record) and the earliest that today can unambiguously be a description of NLCs. They are so well-known that there is a known "normal season" of June-July. Amateurs have been photographing them since at least the mid-70s, when Time magazine, the NYT, and other hysterics were wringing their hands about global cooling.

And where's the evidence that the numbers are increasing? Compared to what, records that span all of a decade, over one small sector of the sky? And even if more are being counted, it could be because there are more people counting, at more places (even when multiple counts of the same clouds are filtered). And do counts have any special meaning vs. total coverage area vs. thickness vs. height? Despite being well-known, though, they are little understood, as the NASA article indicates. Leaping to the singular conclusion that NLCs are related to global warming, much less human-caused global warming, is laughable (even if global temperatures were increasing, which they are not).

Stick to real science, not politics masquerading as science.

Posted by: echlinm | 07/16/09 | 5:34 pm

And i was thinking that since they appeared after the June 12 volcano eruption off of Russia that it was just caused by that.
Not sure why, just the cause vs effect thing.

Posted by: guytron500 | 07/16/09 | 7:07 pm

According to spaceweather.com the increase in noctilucent clouds is pretty well established to be tied to the solar minima our sun is currently undergoing. check out the story here: http://science.nasa.gov/headlines/y2003/19feb_nlc.htm . There is a long history of increasing NLCs during the quiet sunspot spells probably because the upper atmosphere is cooler and more stable during these episodes. This entire story is indicative of the sort of spin which has been infecting so many journalistic organizations. I expected better from Wired, suppose I shouldn't.

Posted by: slave138 | 07/16/09 | 7:32 pm

@echlinm & guytron500: You two obviously didn't get the memo. *Everything* is caused by man-made global warming.

Volcanic eruptions and sunspot activities are the result of our pollution.

We were responsible for the increased temperatures on Mars, and the glaciers melting (except the ones that aren't - which are also the result of man-made global warming).

And we can't forget the chipmunks in CA which moved to the mountains over the last hundred years because there was single decade where the average CA temperature increased a whole 1°C and which had absolutely nothing to do with the population of the state increasing nearly 3000 times.

Posted by: Constellation2050MegaCo | 07/16/09 | 8:07 pm

..Just About The Peoples Of Earth Love To Make Mistake..And That About All Things You Have Being Taught..

..I have lots of more opinions on this story..It's that governments trying to learning how do they do better on astrology,communications and other on environment and weather focus and change on the earth megnetic field, and detecting dark energy, dark matter and universe itself how it makes..Ha..Ha..Ha..

..This story remind me back, what I see when I was in the remote secret government island with the native peoples and catching dark energy and dark matter to turn white dust with my Nobel winners L.C And M.K and others friends and workers..Ha.Ha..Ha..

Posted by: oreomair | 07/16/09 | 8:17 pm

I just do not understand why people continuously mock the scientific community's insinuations that we may be causing (or contributing) to some atmospheric change. All they're trying to do is warn us of something that concerns them. And they're friggin scientists! What, you think they're not working their balls off trying to get us the concrete answers? In conclusion, the sarcastic language is totally unnecessary. I mean, they're friggin scientists, are you that lonely?!

Posted by: pajotech | 07/16/09 | 10:17 pm

The notion that humans are causing global warming is just a sign of our arrogance that we actually control this planet. The Earth has been warming and cooling for many thousands of years without any help from humans. There have been several ice ages to show that the atmosphere & temperature of the Earth changes just fine on it's own. The Earth is gonna shake us off like a bad cold.

Posted by: gerrrg | 07/16/09 | 11:33 pm

The video is much better than the photos, IMO.

Posted by: gerrrg | 07/16/09 | 11:43 pm

@pajotech - ice ages didn't occur over the span of a few hundred years...we're talking thousands of years. The changes we're seeing are occurring much faster, and perfectly coincide with the rise in carbon dioxide measured in the air.

Posted by: nuce51 | 07/17/09 | 12:26 am

Very interesting subject. I notice though, no one here is even considering that the aerosol spray campaign that's been going on around the globe could possibly be contributing to this entire situation. I'm sure the scientists commenting know of this wonderful poisoning of the atmosphere.

Posted by: tqgrim1 | 07/17/09 | 3:20 am

TOTALLY agree w/comment from "oreomair", approx 8pm.

Posted by: Wisdo | 07/17/09 | 8:31 am

Yeash! scientists, what do they know. Rush limbaugh knows. I only listen to him.

Posted by: landers | 07/17/09 | 9:24 am

The sky is falling! The sky is falling!

Sincerely,
Chicken Little

Posted by: alphanumeric1971 | 07/17/09 | 9:33 am

Wow. I saw that myself at work on Tuesday. I was wondering what that was.

Posted by: ChristinaMunro | 07/17/09 | 9:57 am

I know some of you more uptight serious people will get really angry about this but "who says vampires don't glitter" I say it's proof enough. 🙄

Posted by: slave138 | 07/17/09 | 10:07 am

@oreomair: I assume that was at least partly directed at me so I'll bite. I'm being sarcastic because it doesn't seem to matter what environmental topic comes up, if it was in the last 10 years, it's been attributed (at least to some extent) to man-made global warming. It reeks a little too much of people finding some phenomenon and instead of asking 'What caused this?' they ask 'What kind of evidence can we find which will support man-made global warming?'

I'm not some Rush Limbaugh fan or even a Republican-supporter. I believe authority should be questioned over and over because it's far too easy to just swallow whatever you're told.

I'm not a religious person and the Environmentalist movement is looking a little too much like a religion for my tastes. The Greeks attributed any unexplained phenomena as a work of the gods. The sun rises because Apollo pulls it across the sky - there could be no other reason! Dionysus turns the grape juices to wine - there can be no other reason! The sky had a greenish hue today because of man-made global warming - there can be no other reason!

Posted by: joeyjoejoe | 07/17/09 | 11:41 am

Here's some junk science for all of you. Carbon dioxide and methane absorb radiation, and therefore heat. Since nearly all fuels use some form of hydrocarbon, then nearly all combustion produces carbon dioxide. Other fuels can release methane, or water vapor, but the byproduct is always a heat absorbent gas.

You can make points of contention over the anecdotal evidence, such as the noctilucent clouds, it may well be there is some other cause for these.

But the concept of man made global warming is based on very basic chemistry.

If you burn stuff, you release heat absorbing gasses into the air.

But I forgot, science is a government conspiracy just like seat-belts and margarine.

Posted by: muD | 07/17/09 | 12:23 pm

Obviously the aliens are trying to send us a message. The message probably has to do with our imminent doom.

Posted by: iZealot777 | 07/17/09 | 12:38 pm

If the clouds are comprised of ice, how is global warming at fault? Seems that if ice clouds that were formerly further north have moved south, then reason would point to decreasing temperatures in southern locations.

Posted by: ElizabethM | 07/17/09 | 2:04 pm

Amazing how some potentially destructive elements can be so beautiful... like an untamed forest fire. Sad.

Posted by: pzaudke | 07/17/09 | 2:05 pm

Wow. One legitimate climate scientist comments in support of the article's claims, and is immediately shouted down / questioned / ridiculed by 32 non-scientists. Internet democracy in action.

Posted by: HeLeiaSphere | 07/17/09 | 4:17 pm

Yoo hoo. Then there's the heliosphere. It is contracting. "New data has revealed that the heliosphere, the protective shield of energy that surrounds our solar system, has weakened by 25 per cent over the past decade and is now at it lowest level since the space race began 50 years ago." (link - <http://www.telegraph.co.uk/news/worldnews/northamerica/usa/3222476/Suns-protective-bubble-is-shrinking.html>).

Juxtaposed against this:

Consequences of a compressed heliosphere:

(1) Cosmic rays flux modulated by magnetized solar wind:

Cloud nucleation, increase in planetary albedo (Marsh & Svensmark 2000, Carslaw et al. 2002)

Lightning production increase (Gurevich & Zybin 2005)

CR alters ozone layer chemistry (Randall et al. 2005)

CR source DNA mutation (Reedy et al. 1983)

(2) Direct deposition of ISM material onto planetary atmosphere:

Dust deposition could trigger "snowball" Earth episode (Pavlov et al. 2005)

Create mesospheric ice clouds, increase in planetary albedo (McKay & Thomas 1978)

NOCTILUCENT clouds is another term for MESOSPHERIC clouds

Posted by: HeLeiaSphere | 07/17/09 | 4:19 pm

LINK FOR THE CONSEQUENCES OF A CONTRACTING HELIOSPHERE MENTION:

<http://www.google.com/#q=McKay+%26+Thomas+theoretical+model+mesospheric&hl=en&start=10&sa=N&fp=KxYPMM6r3XA>

Posted by: al_bore | 07/17/09 | 4:51 pm

Stop with the global warming propaganda already! Jeez. It's just an excuse to tax the hell out of the useless eaters some more. Ok. Heads back down, go back to grazing. Moooooooooo.....

Posted by: Xaplimatic | 07/17/09 | 6:16 pm

guytron500: How is this "SPIN" ????? They are merely quoting their sources.

Posted by: WILDCAT | 07/17/09 | 8:33 pm

I think formal science, meteorology, and the skywatchers, cited in this article are way behind the ball on noctilucent clouds. I am a college graduate, an author of note and spend enourmas amounts of time, all through my life outside. Usually in spartan or wilderness areas. I have seen these clouds with others at the following locations and dates.

Nantucket Island, winter of 1978-1979 and 1980-1981
First Connecticut Lake New Hampshire, winter 1976-1977
South Florida and Bahamas, many winters at 3-6 am

They are incredible to watch. The colors and the clouds expression of color, is like that of the Northern Lights, to a pleasent degree.

It is as though rust meets the rainbow.

WILDCAT

Posted by: bugmenot | 07/18/09 | 2:27 am

Holy shit, I guessed it was global warming from just reading the headline. It's getting comical how often MMGW keeps getting blamed.

Posted by: pajotech | 07/18/09 | 2:35 am

@gerrrg - I believe that you mis read my post. I said that the Earth has been warming and cooling (meaning ice age) for many thousands of years. Which you proceeded to try to correct my correct statement by saying that "ice ages didn't occur over the span of a few hundred years...we're talking thousands of years". I never said "few hundred years" anywhere in my post. I think if an ice age occurred in a span of a "few hundred years", it would have made the history books somewhere. Your second sentence also misses the point I was making. My point is that the Earth's temperature has been warming and cooling cyclically for many thousands of years, on its own, naturally, without any help from humans, long before humans had developed any capability to affect the Earth's temperature. Previous ice ages had ended due to increases in carbon dioxide in the atmosphere. How did the carbon dioxide increase without humans and their evil polluting ways? For us to say in our short stint on the planet that we are causing such irreparable damage is just arrogant. It's like pissing on a frozen lake in January. Yes, your piss will probably cause the lake to thaw a little sooner in Spring. But come December, it's all frozen again. Yes, we do have an affect, but that affect is miniscule. My concern is that it is being inflated by those with less than noble intentions.

Posted by: brokenpuppet | 07/18/09 | 6:07 am

Global Warming = cover for global geoengineering, see CFR, geoengineering. example- Ionisherich research(HAARP)

Global Warming is THE Catch all phrase of our day and yes it is man made just not the way they would have us believe.

Posted by: VAR1016 | 07/18/09 | 1:56 pm

I suggest that those who wish to photograph these clouds do so fairly quickly - that is if they are caused by "global warming"

Since the Earth has been cooling since 1998, the clouds will, if the "warmists" are correct, become increasingly rare.

Posted by: stevedude | 07/18/09 | 2:10 pm

of course the climate change naysayers are right, far right usually. they know that all these things are really caused by reptilian shapeshifters in blue u.n helmets in unmarked black helicopters who are rounding up all the guns while the gun-owners are staring at the clouds. btw, these reptilian shapeshifters, also responsible for flouride in your water, were previously communists but are now greens. lol. have a nice day.

Posted by: babette | 07/19/09 | 4:07 pm

Nuce51 and a few others are aware of the CHEMICAL SPRAYING that's been going on for over a decade creating a chem-dome over our heads!

The rest-keep braying about global warming. That's just what they want you to believe! 'Course pollution is the "little" people's fault...ha! Not the corporations, not the military, not Big Pharma — no, 'course not.

Take a look at sites such as "STRANGE DAYS, STRANGE SKIES" and "HAARP" for heaven's sake! Get informed!

When you get taxed for BREATHING then you'll get the big picture!

911=USrael

Posted by: teddy33 | 07/19/09 | 4:39 pm

"Noctilucent clouds were first observed in 1885 by an amateur astronomer. No observations of anything resembling noctilucent clouds before that time has ever been found."

1885... just about the time our Co2 really got cookin'...

Posted by: shawnJ3sse | 07/19/09 | 4:59 pm

saw the same thing in olympia washington

Posted by: Paul33 | 07/19/09 | 6:36 pm

It is amazing that the one person actually qualified to comment on this topic - i.e. a climate scientist - is shouted down.

It is also amazing that some people believe / want to believe that 50,000+ coal-fired power stations running 24/7, a few hundred million internal combustion engines running daily, a few hundred

container ships (each equal to tens of millions of cars in terms of pollution) , and about 100 years worth of miscellaneous industrial gas pollution would *not* have an effect on the biosphere and climate of a planet...

To the skills for fossil fuel energy companies - if the products you defend are so safe, why don't you run a hose from your exhaust pipe into the cabin of your SUV? HMMM?

Posted by: JohnHendricks | 07/19/09 | 7:18 pm

What is wrong with people that they cannot see what is right before their eyes? We have been watching since 1997 as high altitude planes laid down chemtrails. Do a google. When we were in Flagstaff in 1998 the sky was a checkboard pattern and we pointed this out to people who said "I don't see anything unusual."

What is wrong with people? This is all blamed on the "little guy" having a backyard barbeque, and driving an SUV, and keeping his home too warm! I saw a Roadrunner cartoon just yesterday that had chemtrails in the sky. I understand that the old movies, like The Sound of Music are being touched up to include chemtrails in what was formerly a clear blue sky. But people are so stupid (excuse me, but I think that is an accurate statement) that they buy into the idea that the little guy has caused this. The only gratitude I can find is that they too will suffer in the end.

Posted by: fjerins | 07/19/09 | 8:03 pm

Does the word HARRP come to mind? Weather modification that come from Alaska close to the North Pole. look it up on the net. HARRP.

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