

Dear Sir, I would like to respond to the article "Flawed climate data" by Ross McKittrick, Financial Post, Published: Friday, October 02, 2009

Flawed climate data does not impact scientific consensus

Ross McKittrick's needs no longer be "exasperated" by fellow academics who do not "bother [sic] to investigate any of the glaring scientific discrepancies and procedural flaws" in climate change literature. I am a professor of biology (Université de Montréal) and like McKittrick, a professor of economics (University of Guelph), I do not fit well in the domain of global atmospheric science research, a domain typically reserved for people with training in climatology. Indeed, according to McKittrick's web page he has not made a single contribution to the climate change literature in a reputable scientific journal. His forums are journals that are not recognized by the Institute for Scientific Information (ie. Energy and Environment) or letters journals (i.e. Geophysical Research Letters), newspapers or books.

I give no airs of contributing to the climatology literature but I do my best to stay abreast of findings, and I will try and paraphrase some of the important take-home-messages on the science and also on the wider issue of climate change including future predictions.

Perhaps the most important issues, what is the future of climate change and what can be done about it are also the most difficult for scientists to address. The first issue, what is the future of climate change, is the primary issue of skeptics of climate change, including McKittrick, for the simple reason that it is by necessity predictive and based on models that are calibrated on past observations. But before I get to that here's some background on climatology and climate change.

What I have learned is that the science of past climate change is quite good. The main source of global temperature warming and regulation are the oceans. They hold about 1000 times the heat and 50 times the CO₂ as the atmosphere. They are an important reservoir of CO₂ and exert a fundamental force on the atmosphere. The ocean is 300 times more massive than the atmosphere and changes much slower and therefore is an important regulator of climate and climate change. Injecting CO₂ into the ocean over the past century will be felt for decades from now because the ocean paces and buffers the changes in the climate. This is the so-called 'committed warming' that the scientists talk about when they say the climate will continue to warm even if we stop emitting carbon dioxide (CO₂). The other major source of heat in the atmosphere is infrared emitted by the earth. This IR radiation is reflected by the high atmosphere CO₂ back into the lower atmosphere. CO₂ is not the only greenhouse gas; others include methane, ozone, halocarbons, and water vapor. It is water (not CO₂) that feeds back heat. CO₂ causes more reflected heat, consequently water vapor goes up, causing more heating. It is important to note that it is extremely difficult to separate the effects of CO₂ from other green house gasses (but it is the most abundantly emitted human gas) but the gasses as a whole can be separated from natural drivers.

Temperature has been going up for the past century (averaging for seasonal changes: With the onset of winter things cool and organisms die releasing CO₂ into the atmosphere and visa-versa; as things grow the CO₂ content goes down). The Greenland and Antarctic ice core record go back 650,000 and 800,000 years. Over this period CO₂ in the atmosphere has always been in the 100-370 parts per million range (changing over

interglacial changes), today it is about 387 (it may have been higher in the millions of years time scale – especially the Cambrian Period). We don't have any idea what today's elevated CO₂ levels will do because they are unprecedented.

Global mean average temperature rose rapidly from 1910 to the 1940's, then cooled through to the '70's, then rose rapidly again despite a steady increase in CO₂ emissions. This observed cooling trend is a second platform for the skeptics. The dynamics of this observed temperature change is not well understood but it was probably due to the injection of aerosols (dust, particles) into the atmosphere following World War II. It's hard to know the total effects of aerosols because many cool, but some cause nucleation of water resulting in warming.

The reasons the Arctic is heating more than the rest of the globe is not clear but melting ice causes a feedback. Melted ice opens dark water that absorbs more heat.

When we talk about global warming we are talking about a global mean over decades. Year to year variations are meaningless because weather systems and other natural forces are dynamic. Troposphere changes due to *El Nino* by heat being transferred from oceans to atmosphere, for example.

Also volcanic eruptions complicate the temperature means. El Chichón, Mexico (1985) and Pinatubo, Philippines (1993) injected a lot of sulfur dioxide into atmosphere, turning to sulphuric acid, causing a cooling of the earth's surface and a warming of the stratosphere.

That recent warming is based on human CO₂ buildup is a hypothesis. It is based on basic physics, atmospheric chemistry and observations of CO₂ gas buildup causing warming. It is important to note that modeling supports the warming trend but the science of global warming is fundamentally based on observations.

Observations supporting that green house gas buildup causes warming include:

i) That the stratosphere is cooling, not warming, contradicts ideas that the warming is due to solar forcing. It is cooling because IR is being reflected back to the earth. If solar forcing were the main driver then we would expect the stratosphere to be warming with the lower atmosphere.

ii) *El Nino*'s and ocean oscillations cause changes in the troposphere (reflecting the multi-year dynamic) by moving a lot of heat from the ocean to the atmosphere. If *El Nino*'s and Oceanic Oscillations (natural variations) were the primary driver of recent warming we would expect a heterogeneity among global ocean temperatures (one ocean heats while another cools) but instead what we see is a warming of all oceans across the globe.

iii) The third point that supports human driven heating is that we are seeing that nights are affected more than the days - fewer cold nights than cold days, and more warm nights than warm days (nights are affected more than the day). This is an expected consequence of green house gas because at night the only thing keeping the surface warm is the atmosphere. In the daytime there are clouds, sunlight etc. that contribute to warming.

A very important point here is that we do not know what the future holds with continued global warming. These predictions are by necessity based on calibrating models on past observations. They are problematic for reasons of parameterizations and because we have no experience present elevated levels of atmospheric CO₂. Pertinent issues include:

Ocean level rising (melting of Greenland and Antarctic ice sheets and thermal expansion). We are not sure how this is happening. The best data comes from the Larsen A ice shelf disintegrated in 1995 and the Larsen B (3200 sq. km) ice shelf disintegrated in 2002. The B ice shelf acted as a buttress to glaciers flowing into the ocean and its disappearance has caused further ice to enter the ocean (another observed feedback).

Two problems. We don't understand well the loss of ice (but we observe the loss) and so it is hard to know how much and how rapidly the ice will continue to melt (which releases more CO₂). A 1-meter rise in the next century seems probable, eroding shorelines, causing more extensive storm surges, displacing about 2/3 of the world's population.

Drought. What appears to happen as sea level temps change it consequential changes the moisture content available to the terrestrial system. Most susceptible are places like the western states and the region from Senegal to Ethiopia. Warming causes climate zones to shift north and so dryer latitudes are expected to move north to where we presently produce most of our food. Drought conditions are expected to expand with warming. But as I said, we don't know what will happen.

As a conclusion climate change is something we need to think about as a risk. We only have one climate and therefore, even due to the uncertainties, we run an enormous risk by doing nothing.

On the Skeptics: It is true that the vast majority of scientists have agreed on the issue of human drivers of climate change. Allot of the skepticism, including McKitrick's, are not valid or oversimplified to the point that they embarrass me. McKintrick rejects the whole of climate change science by cherry picking problems with future predictive models. The modelers themselves are their own best critics, but they do not join McKitrick in ignoring the past and present observations that I have outlined above. Credible sources of climate change skeptics come primarily from the disciplines of physics (this seems to be an especially vocal and over simplifying group) and engineering. I have found no skeptics that are credible climatologists or oceanographers - i.e. people that specialize in climate. Again, the primary skepticism is of the predictive models (feedbacks of k, f, etc) and not of the observed data and trends. These people simply do not understand how climate functions and they simply need to mature their scientific understanding. Another shrinking source of critics come from the general public. These people are confused largely by misinformation coming from authors who pose as authorities, the energy sector, or they are individuals that have a mind-set based more on wished-belief rather than on facts. This final group by-and-large overlaps with the people that do not have an ethic of conservation and simply do not believe in being responsible for one's own actions.

Your sincerely,
Chris Cameron

COMMENTS

by climate realist
Nov 04 2009
10:41 Am

This Chris Cameron from the University of Montreal is a real peach isn't he?! You may want to think twice before paying to get an a so called education at the U of M with nitwits like him running the show there! Here's a few of his gems:

"The reasons the Arctic is heating more than the rest of the globe is not clear but melting ice causes a feedback. Melted ice opens dark water that absorbs more heat."

"A 1-meter rise in the next century seems probable, eroding shorelines, causing more extensive storm surges, displacing about 2/3 of the world's population."

Gee Chris, did you just make this stuff up? Ever looked at the temperature history of the Arctic? You know the fact that temperatures rose just as quickly and as far in the 1930's and 1940's before cooling down again! This clearly demonstrates the cyclicity of Arctic temperatures, driven by ocean current cycles! As to the nonsense of positive feedback from ice melt, remember that the main drop in ice levels has occurred late in summer where the solar incidence angle is so low the water absorbs little radiation! That and the fact that open water radiates heat much more readily to the atmosphere and thence to space thereby actually increasing the cooling of the planet.

As to this so called 1m ice melt looks like he just pulled it out of his hat - even the high end of IPCC estimates isn't close to this level. And what is this 2/3 population displacement with a 1m rise? Looks like he pulled that out his hat too!

Chris Cameron is just indicative of those so-called educated "elite" who either through plain ignorance or wilful dishonesty give life to the global warming fraud!

by Cameron
Nov 04 2009
7:55 Pm

Dear 'climate realist',

The Université de Montréal is currently ranked 91st in the top 100 universities in the world by Times Higher Education – and it has exceedingly low tuition costs - two very good reasons for considering it

twice!

The IPCC report does not provide an upper bound for projected sea level rising. It is a conservative document that bases many of its predictions on 2003 levels of atmospheric CO₂. Since 2003 atmospheric CO₂ has increased. My reference to a 1 meter sea level rise did not come from my hat but from: Nicholls, RJ, Leatherman, SP. 1996. Adapting to sea-level rise: Relative sea-level trends to 2100 for the United States. Coastal Management Vol. 24, no. 4, pp. 301-325.

I am aware of the global (not just arctic) warming trend that occurred in the 1940's. Indeed I address it in paragraph 6 of my initial comment. One need not wonder, given your inability to critique a simple comment, your befuddling of the scientific literature.

On open water absorbing radiation: This fact that is widely represented in the literature. A simple experiment that I do with 3rd year (elementary school) students is to place two buckets of water outside on a Canadian winter day: one bucket must be black, the other white. After a few hours I ask the students to measure the water temperature. Not only does the black bucket contain warmer water but this very simple trick, used to extract heat from the sun, is used by thousands of homes to preheat their boiler water. It's cost saving and good for the environment.

If you are able to take a bit of advice from this 'educated elite' (I don't feel I deserve this compliment but thank you nonetheless) I would encourage you to take an objective view and base your opinions on peer reviewed scientific literature. Derisive comments formed by reading opinion articles in the National Post, on the Climate Realists web blog, in Energy and Environment or the National Inquirer will only serve to further muddle your thinking.

You might also consider standing behind your words rather than the misnomer 'climate realist'.

Cordially,

Chris Cameron

by climate realist
Nov 05 2009
12:26 Pm

"On open water absorbing radiation: This fact that is widely represented in the literature. A simple experiment that I do with 3rd year (elementary school) students is to place two buckets of water outside on a Canadian winter day: one bucket must be black, the other white."

This comment by Chris Cameron shows how inept he is at basic science. First of, did he make sure that no solar radiation imparted on the walls of these buckets both on their exterior and interior? Probably not! Also, did he ensure the experiment was carried out in an environment representative of the Arctic where in late summer the incident angle of solar radiation would average something on the order of 80 degrees from vertical?

Definitely not!

Like I said folks, don't go to U of M!

by Cameron
Nov 05 2009
2:55 Pm

Dear "climate realist"

According to:

R.W. Lindsay and J. Zhang. 2005. The Thinning of Arctic Sea Ice, 1988–2003: Have We Passed a Tipping Point? *Journal of Climate*. vol 18: 4879-4894.

"The increasing amounts of summer open water allow for increasing absorption of solar radiation, which melts the ice, warms the water, and promotes creation of thinner first-year ice, ice that often entirely melts by the end of the subsequent summer. "

Yours,

Chris Cameron

by climate realist
Nov 05 2009
3:31 Pm

"The Thinning of Arctic Sea Ice, 1988–2003: Have We Passed a Tipping Point? "

Apparently not as minimum Arctic ice extent has increased by a million square km. over the last 2 years!

www.ijis.iarc.uaf.edu/.../seaice_extent.htm

by climate realist
Nov 05 2009
11:10 Pm

Chris Cameron: "The IPCC report does not provide an upper bound for projected sea level rising."

You just make that up too Chris? Try a quick Google search on "IPCC sea level". My first hit was the Alarmist site RealClimate which quite clearly indicates the upper bounds in the IPCC report.

www.realclimate.org/.../the-ipcc-sea-level-numbers

Note: They're a bit short of 1m even in the most extreme scenario!

by Cameron
Nov 06 2009
2:00 Pm

Dearest 'climate realist',

Haven't we already discussed web-blogs as a resource for scientific information?

From the IPCC summary report, Section 3.2 (p. 45):

"Because understanding of some important effects driving sea level rise is too limited, this report does not assess the likelihood, nor provide a best estimate or an upper bound for sea level rise."

I can't say I blame you for wanting to remain anonymous.

Yours,

C. Cameron

"Flawed climate data" by Ross McKittrick, Financial Post, Published: Friday, October 02, 2009

Beginning in 2003, I worked with Stephen McIntyre to replicate a famous result in paleoclimatology known as the Hockey Stick graph. Developed by a U.S. climatologist named Michael Mann, it was a statistical compilation of tree ring data supposedly proving that air temperatures had been stable for 900 years, then soared off the charts in the 20th century. Prior to the publication of the Hockey Stick, scientists had held that the medieval-era was warmer than the present, making the scale of 20th century global warming seem relatively unimportant. The dramatic revision to this view occasioned by the Hockey Stick's publication made it the poster child of the global warming movement. It was featured prominently in a 2001 report of the U.N. Intergovernmental Panel on Climate Change (IPCC), as well as government websites and countless review reports.

Steve and I showed that the mathematics behind the Mann Hockey Stick were badly flawed, such that its shape was determined by suspect bristlecone tree ring data. Controversies quickly piled up: Two expert panels involving the U.S. National Academy of Sciences were asked to investigate, the U.S. Congress held a hearing, and the media followed the story around the world.

The expert reports upheld all of our criticisms of the Mann Hockey Stick, both of the mathematics and of its reliance on flawed bristlecone pine data. One of the panels, however, argued that while the Mann Hockey Stick itself was flawed, a series of other studies published since 1998 had similar shapes, thus providing support for the view that the late 20th century is unusually warm. The IPCC also made this argument in its 2007 report. But the second expert panel, led by statistician Edward Wegman, pointed out that the other studies are not independent. They are written by the same small circle of authors, only the names are in different orders, and they reuse the same few data climate proxy series over and over.

Most of the proxy data does not show anything unusual about the 20th century. But two data series have reappeared over and over that do have a hockey stick shape. One was the flawed bristlecone data that the National Academy of Sciences panel said should not be used, so the studies using it can be set aside. The second was a tree ring curve from the Yamal Peninsula in Siberia, compiled by UK scientist Keith Briffa.

Briffa had published a paper in 1995 claiming that the Medieval period actually contained the coldest year of the millennium. But this claim depended on just three tree ring records (called cores) from the Polar Urals. Later, a colleague of his named F.H. Schweingruber produced a much larger sample from the Polar Urals, but it told a very different story: The medieval era was actually quite warm and the late 20th century was unexceptional. Briffa and Schweingruber never published those data, instead they dropped the Polar Urals altogether from their climate reconstruction papers.

In its place they used a new series that Briffa had calculated from tree ring data from the nearby Yamal Peninsula that had a pronounced Hockey Stick shape: relatively flat for 900 years then sharply rising in the 20th century. This Yamal series was a composite of

an undisclosed number of individual tree cores. In order to check the steps involved in producing the composite, it would be necessary to have the individual tree ring measurements themselves. But Briffa didn't release his raw data.

Over the next nine years, at least one paper per year appeared in prominent journals using Briffa's Yamal composite to support a hockey stick-like result. The IPCC relied on these studies to defend the Hockey Stick view, and since it had appointed Briffa himself to be the IPCC Lead Author for this topic, there was no chance it would question the Yamal data.

Despite the fact that these papers appeared in top journals like Nature and Science, none of the journal reviewers or editors ever required Briffa to release his Yamal data. Steve McIntyre's repeated requests for them to uphold their own data disclosure rules were ignored.

Then in 2008 Briffa, Schweingruber and some colleagues published a paper using the Yamal series (again) in a journal called the Philosophical Transactions of the Royal Society, which has very strict data sharing rules. Steve sent in his customary request for the data, and this time an editor stepped up to the plate, ordering the authors to release their data. A short while ago the data appeared on the internet. Steve could finally begin to unpack the Yamal composite.

It turns out that many of the samples were taken from dead (partially fossilized) trees and they have no particular trend. The sharp uptrend in the late 20th century came from cores of 10 living trees alive as of 1990, and five living trees alive as of 1995. Based on scientific standards, this is too small a sample on which to produce a publication-grade proxy composite. The 18th and 19th century portion of the sample, for instance, contains at least 30 trees per year. But that portion doesn't show a warming spike. The only segment that does is the late 20th century, where the sample size collapses. Once again a dramatic hockey stick shape turns out to depend on the least reliable portion of a dataset.

But an even more disquieting discovery soon came to light. Steve searched a paleoclimate data archive to see if there were other tree ring cores from at or near the Yamal site that could have been used to increase the sample size. He quickly found a large set of 34 up-to-date core samples, taken from living trees in Yamal by none other than Schweingruber himself! Had these been added to Briffa's small group the 20th century would simply be flat. It would appear completely unexceptional compared to the rest of the millennium.

Combining data from different samples would not have been an unusual step. Briffa added data from another Schweingruber site to a different composite, from the Taimyr Peninsula. The additional data were gathered more than 400 km away from the primary site. And in that case the primary site had three or four times as many cores to begin with as the Yamal site. Why did he not fill out the Yamal data with the readily-available data from his own coauthor? Why did Briffa seek out additional data for the already well-represented Taimyr site and not for the inadequate Yamal site?

Thus the key ingredient in most of the studies that have been invoked to support the Hockey Stick, namely the Briffa Yamal series, depends on the influence of a woefully thin subsample of trees and the exclusion of readily-available data for the same area. Whatever is going on here, it is not science.

I have been probing the arguments for global warming for well over a decade. In collaboration with a lot of excellent coauthors I have consistently found that when the layers get peeled back, what lies at the core is either flawed, misleading or simply non-existent. The surface temperature data is a contaminated mess with a significant warm bias, and as I have detailed elsewhere the IPCC fabricated evidence in its 2007 report to cover up the problem. Climate models are in gross disagreement with observations, and the discrepancy is growing with each passing year. The often-hyped claim that the modern climate has departed from natural variability depended on flawed statistical methods and low-quality data. The IPCC review process, of which I was a member last time, is nothing at all like what the public has been told: Conflicts of interest are endemic, critical evidence is systematically ignored and there are no effective checks and balances against bias or distortion.

I get exasperated with fellow academics, and others who ought to know better, who pile on to the supposed global warming consensus without bothering to investigate any of the glaring scientific discrepancies and procedural flaws. Over the coming few years, as the costs of global warming policies mount and the evidence of a crisis continues to collapse, perhaps it will become socially permissible for people to start thinking for themselves again. In the meantime I am grateful for those few independent thinkers, like Steve McIntyre, who continue to ask the right questions and insist on scientific standards of openness and transparency.

- Ross McKittrick is a professor of environmental economics at the University of Guelph, and coauthor of *Taken By Storm: The Troubled Science, Policy and Politics of Global Warming*.