Post

Understanding Blogs

This study explores your memory for the material you are about to read. The study also queries your beliefs about the topic discussed and your attitudes towards the material presented. The survey consists of reading a blog article, followed by several comments from bloggers and around 10 questions relating to the blog and the comments. There may be a debriefing and some additional questions afterwards. The survey should take no more than 20-25 minutes to complete.

Participation in this study is entirely voluntary. Completion of this Internet survey is taken to constitute your consent to participate. If you do not wish to participate, exit this webpage now.

The data will be analyzed without regard to your identity. If the results from this study are published, only aggregate results will be reported and individual responses will not be identifiable.

If you have any questions please do not hesitate to contact the experimenter, Dr Nicolas Fay, at nicolas.fay@uwa.edu.au.

The Human Research Ethics Committee at the University of Western Australia requires that all participants are informed that, if they have any complaint regarding the manner in which a research project is conducted, it may be given to the researcher or, alternatively to the Secretary, Human Research Ethics Committee, Registrar's Office, University of Western Australia, 35 Stirling Highway, Crawley, WA 6009 (telephone number +61 8 6488-3703).

Please read the following blog post carefully, you will be asked some questions about it at the end. You need to answer those questions correctly in order to qualify and receive the incentive.

How we know we're causing global warming in a single graphic

Posted on 27 July 2014 by ClimateBlogger

In 1859, physicist John Tyndall ran an experiment demonstrating the greenhouse effect. Visible sunlight easily passes through our atmosphere to warm the Earth. However, invisible heat rays rising from the Earth's surface, otherwise known as infrared radiation, don't easily escape back to space. What Tyndall showed by shining heat rays through tubes filled with different gases is that certain gases like water vapour and carbon dioxide block the heat rays. These became known as greenhouse gases.

Tyndall also predicted what we expect to see if greenhouse gases were causing warming (Tyndall 1861). There are a number of distinctive patterns in greenhouse warming. Observing these patterns strengthens the evidence that humans are causing global warming. They also eliminate other possible natural causes.

Humans are raising CO2 levels

The first point to establish is that humans are causing the rise in atmospheric CO2 levels. This fact is common sense. The amount of CO2 in the atmosphere is going up by around 15 billion tonnes per year. Humans are emitting around twice that much! Atmospheric CO2 levels are currently around 390 parts per million, having increased 40% from pre-industrial levels.

On top of this, many lines of evidence confirm that we're the cause of rising CO2 levels. When we measure the type of carbon building up in the atmosphere, we observe more of the type of carbon that comes from fossil fuels (Manning 2006). As you burn fossil fuels, you take oxygen out of the atmosphere. Oxygen levels are falling in line with the amount of carbon dioxide rising (Manning 2006). "Fossil fuel carbon" has sharply risen in corals (Pelejero 2005) and sea sponges (Swart 2010). Our CO2 emissions are penetrating even to the ocean depths (Murata 2010). Tree-ring measurements confirm human activity is the cause of rising CO2 (Levin 2000).

The extra CO2 is trapping heat

If carbon dioxide is trapping more heat, we should see less heat escaping to space. Satellites measuring infrared radiation coming from Earth find less heat escaping to space over the last few decades. This is happening at those exact wavelengths that carbon dioxide absorbs energy (Harries 2001).

If less heat is escaping to space, there's only one place it can go - back to the Earth's surface. Scientists check this by measuring infrared heat coming down from the atmosphere. These measurements confirmed the satellite data - more heat is returning to the Earth's surface (Philipona 2004).

Global warming has a distinct greenhouse signature

In 1859, Tyndall predicted that greenhouse warming should cause nights to warm faster than days. This is because at night, the Earth's surface cools by radiating heat out to space. Greenhouse gases trap some of this heat, slowing the night-time cooling. Over 140 years later, Tyndall's prediction has been confirmed. Over the last few decades, scientists have observed nights warming faster than days (Braganza 2004).

Tyndall also predicted that greenhouse gases should also slow down winter cooling. So he anticipated winters warming faster than summers. Again, recent research over the last few decades bear this out (Braganza et al 2003). Both thermometers and satellites find winters warming faster than summers.

Another distinctive greenhouse pattern can be found in the atmosphere. As heat is being trapped, we expect to see the lower atmosphere to warm. But with less heat escaping to space and more carbon dioxide in the stratosphere, we also expect to see the upper atmosphere cool. Satellites and weather balloons both observe this contrast between upper cooling and lower warming (Jones 2003).

With the lower atmosphere warming and the upper atmosphere cooling, the boundary between the troposphere and stratosphere, otherwise known as the tropopause, should rise as a consequence of greenhouse warming. This has been observed (Santer 2003). We are changing the very structure of our atmosphere.

What's fascinating about all these greenhouse signatures is they also rule out a number of other potential causes of global warming. If the sun was causing global warming, it would cause summers to warm faster than winter, days to warm faster than nights and the upper atmosphere to warm. Observations rule out the sun.

Similarly, the pattern of ocean warming rules out ocean cycles as the driver of global warming. The world's oceans have been building up heat over the past half century. This isn't a case of heat shifting around due to ocean cycles but the entire global ocean system building up heat. The specific pattern of ocean warming, with heat penetrating from the surface, can only be explained by greenhouse warming (Barnett 2005).

If it walks like a duck and quacks like a duck...

Current global warming shows all the distinctive signatures of greenhouse warming. To be skeptical that humans are causing global warming, you must believe two things. Something unknown is causing warming that happens to mirror the greenhouse effect. And something unknown is somehow suppressing the well understood (and well observed) greenhouse effect. So we can accept what we know to be true (greenhouse warming) or we accept two unknowns.

The saying goes if it walks like a duck and quacks like a duck, then it must be a duck. But climate skeptics are trying to convince us it's some other, undefined animal impersonating a duck that's also mysteriously hiding the real duck.

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The blog post you just read suggested that the climate has been changing due to changes in the ocean.

- Yes
- No

The blog post you just read suggested that Bono (U2 singer) should have no business in politics.

- Yes
- No

The blog post you just read stated that atmospheric CO2 levels have risen 40% since pre-industrial times.

- Yes
- No

Once you have answered the questions, click below to read comments on the blogpost

Default Question Block

Comments

LM

According to the National Parks Conservation Association, most of our coral reefs are from 5000 to 10000 years old.

Cave drawings were often made with carbon. We find carbon when we dig in the floors of old caves. That's coal. Obviously, coral will contain carbon from coal burned over the last 10000 years or so. If you assume that all that carbon in the coral came from fossil fuels only in recent years then you can draw a very pretty hockey stick. But if you average the data over 10000 years you get a flat line.

Every year since the little ice age there have been hypothermia deaths reported in the world's newspapers. Every year. No exceptions. The hypothermia deaths statistics are out there on the web for anybody to find. I thought global warming was supposed to put an end to these deaths. Or maybe there is no global warming.

Gunpowder

We all know water vapour is the strongest greenhouse gas and it blocks all the spectral lines of CO2 so CO2 can't add additional heat. For CO2 to do that it would have to break the law of thermodynamics. All these arguments for an increased greenhouse effect apply just as well to water vapour as they do to CO2. They're not human fingerprints – they're fingerprints of increased water vapour in the atmosphere. And more water vapour in the air has been observed by satellites. Empirical evidence that wipes out half the human fingerprints listed above, in one fell swoop!

steveo

Warmists love diagrams like this. Lots of stuff happening but not much detail on why, just their speculations. Oh, and lots of not too subtle 'guilt trips' as well. But what haven't they told us? That human emissions are only 3% - 3/100ths - of what the natural world emits every year. And the oceans hold 60 times as much dissolved CO2 as all the atmosphere. All it takes is a burp in the oceans and up goes CO2. A single volcanic eruption cancels out any CO2 emission cuts we might have done over the last few years. So why bother? And they think we are causing something! Do the math guys then go find another 'cause'.

Tambourine

What this post fails to mention is other factors also affect climate. Urban heat island also causes nights to warm faster than days. Ozone depletion causes the stratosphere to cool. Rising water vapour levels create an increased greenhouse effect. This supposed evidence is just cherry picking supporting evidence and hiding the rest.

Grand Poobah
What the heck? How can the author think that a colorful - dare I say cute? - picture refutes what scientists have shredded to pieces easily? The post is just dropping names like they are reliable sources, even though Climategate tied some of them to fraud and misbehaving. The temperature measurements quoted in this article come from the same university where the Climategate emails were leaked from. If water vapour wiped out half the fingerprints in this article, Climategate wiped out the other half! Mark my words: you'll see some of these people being prosecuted in the not so distant future for perpetuating lies and making big bucks! ;

barberella
What this article fails to mention is that the planet hasn't warmed in 15 years - just ask Climategate Phil Jones. Was that graphic created in 1995? Plus sea level actually dropped since 2010. Antarctic sea ice has been growing over the last few decades. I guess we know we're not causing global warming!

cyborg
The article cites ocean warming as evidence. And yet ocean warming has stalled since 2003. We're now measuring ocean heat more accurately than ever before with thousands of ARGO buoys all over the world's oceans. What do they find? No ocean warming over the last 8 years. More than 90% of global warming is going into the oceans, which means ocean heat is the best measure for global warming. The conclusion is obvious - humans can't be causing global warming because global warming isn't happening!

g-whizz
And what else is missing from this cartoon?
COSMIC RAYS!
Haven't these guys even heard about the recent research at CERN (Just about the most important physics research centre in the world!) Research confirming that Cosmic Rays from outer space make these thing called CCN's that control clouds. Change the clouds and you change the Climate! And what controls how many Cosmic Rays reach the Earth? Not CO2! The Sun. So the Sun really does control climate.
Its over you losers, your scam is busted. Time to see if you can handle doing Real Science!

Tambourine
Good point re cosmic rays. The simplistic argument that the sun can't cause global warming only looks at one possible link between sun and climate - total solar irradiance. But the relationship between the sun and our climate is much more complicated than that, as the solar magnetic field modulates the amount of cosmic radiation hitting the earth. This affects cloud formation which also interacts with our climate in complicated ways, with lower clouds causing cooling and higher clouds causing warming. A prettily coloured graphic created for young children doesn't even begin to capture the complexities of our climate system.

deeb
The sun rises and the sun sets, and hurries back to where it rises. The wind blows to the south and turns to the north; round and round it goes, ever returning on its course. All streams flow into the sea, yet the sea is never full. To the place the streams come from, there they return again. What has been will be again, what has been done will be done again; there is nothing new under the sun. Is there anything of which one can say, "Look! This is something new"? It was here already, long ago; it was here before our time. The climate's changed before, yet we're still here. Everything will be just fine in the fullness of time.

Click below to answer questions

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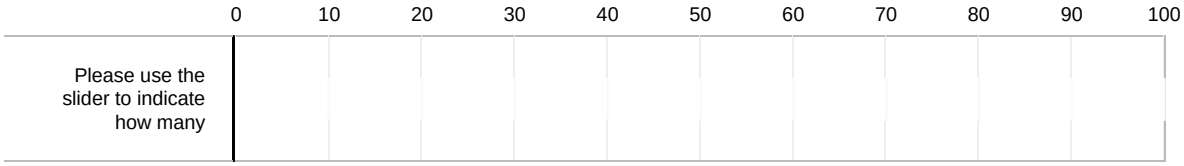
My opinion about a blogpost is completely unaffected by the comments made on the article by others.

How much do you agree with the above statement?

- Strongly Disagree
- Disagree
- Neither Agree nor Disagree
- Agree
- Strongly Agree

Out of every 100 readers of this post, how many do you think support the basic argument made in this blog post?



Overall, I support the basic argument made in this blog post.

How much do you agree with the above statement?

- Strongly Disagree
- Disagree
- Neither Agree nor Disagree
- Agree
- Strongly Agree

I believe that the climate is always changing and what we are currently observing is just natural fluctuation.

How much do you agree with the above statement?

- Strongly Disagree
- Disagree
- Neither Agree nor Disagree
- Agree
- Strongly Agree

I believe that most of the warming over the last 50 years is due to the increase in greenhouse gas concentrations.

How much do you agree with the above statement?

- Strongly Disagree
- Disagree
- Neither Agree nor Disagree
- Agree
- Strongly Agree

I believe that the burning of fossil fuels over the last 50 years has caused serious damage to the planet's climate.

How much do you agree with the above statement?

- Strongly Disagree
- Disagree
- Neither Agree nor Disagree
- Agree
- Strongly Agree

Human CO2 emissions cause climate change.

How much do you agree with the above statement?

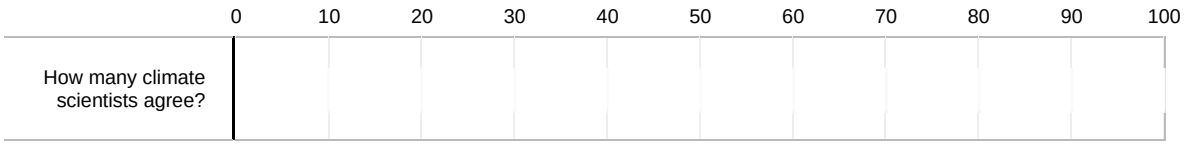
- Strongly Disagree
- Disagree
- Neither Agree nor Disagree
- Agree
- Strongly Agree

Humans are too insignificant to have an appreciable impact on global temperature.

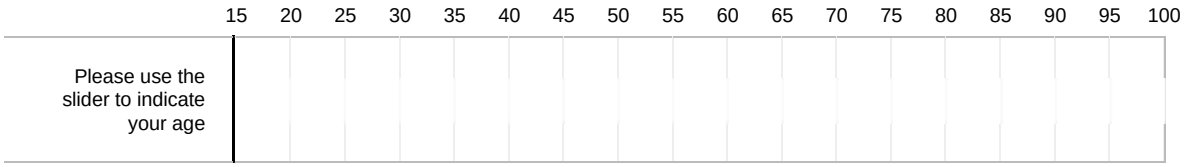
How much do you agree with the above statement?

- Strongly Disagree
- Disagree
- Neither Agree nor Disagree
- Agree
- Strongly Agree

On a scale from 0% to 100%, in your opinion, how many climate scientists agree that human activity is causing global warming?



What is your age?



What is your gender?

- Male
- Female

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Debriefing

Please note that the comments provided after the blog post were presented solely for experimental purposes. The comments misrepresent current scientific knowledge and are thus misleading.