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.

Why we can chill out about global warming

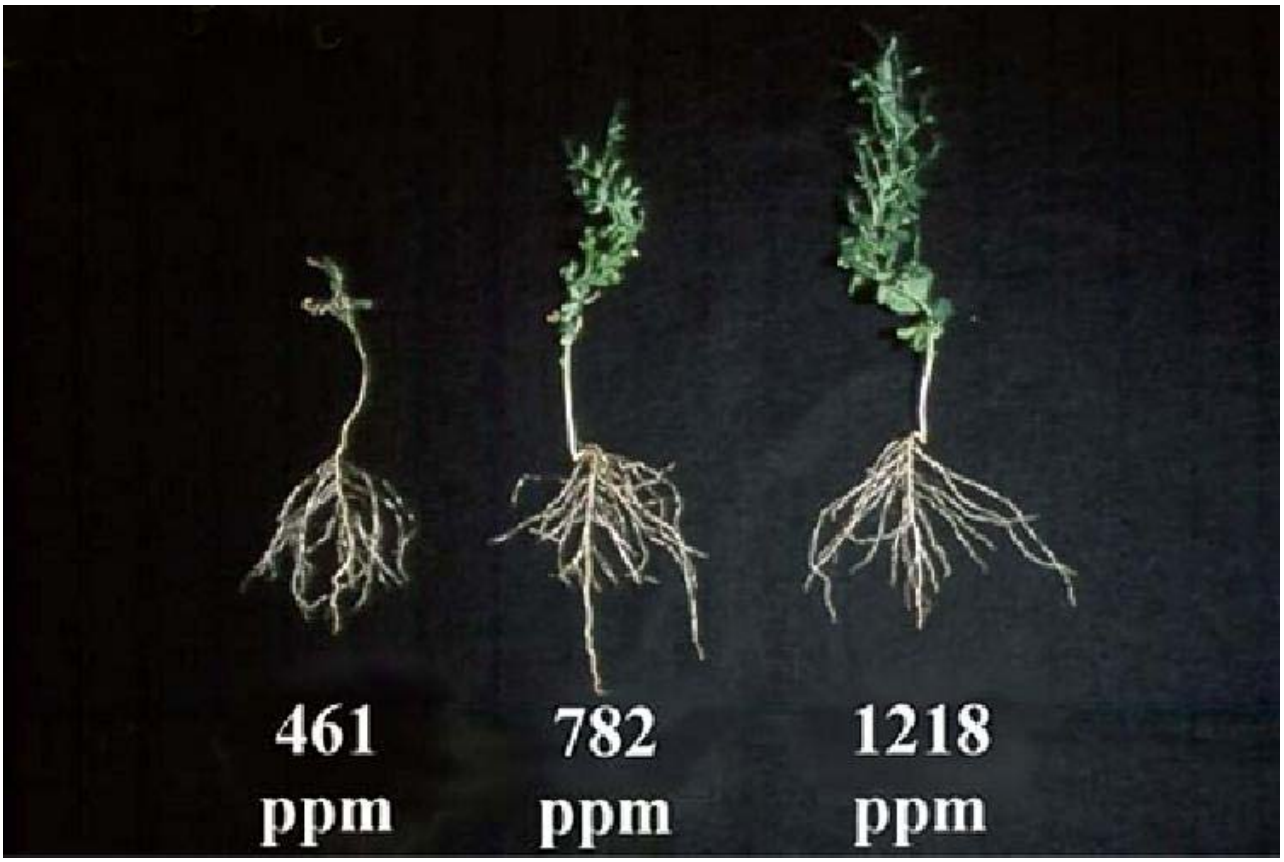
Posted on 27 July 2014 by ClimateBlogger

People on either side of the climate debate agree climate change is happening. After all, climate has always changed. Several centuries ago, the Earth experienced a Little Ice Age where people ice skated on the Thames River in the UK. A thousand years ago during the Medieval Warm Period, Vikings settled in Greenland, which got its name from the lush, green conditions at the time. If there is one truism that holds throughout Earth's history, long before the invention of SUVs and plasma televisions, it's that climate changes. So the key question of the climate debate is this - are humans causing global warming now?

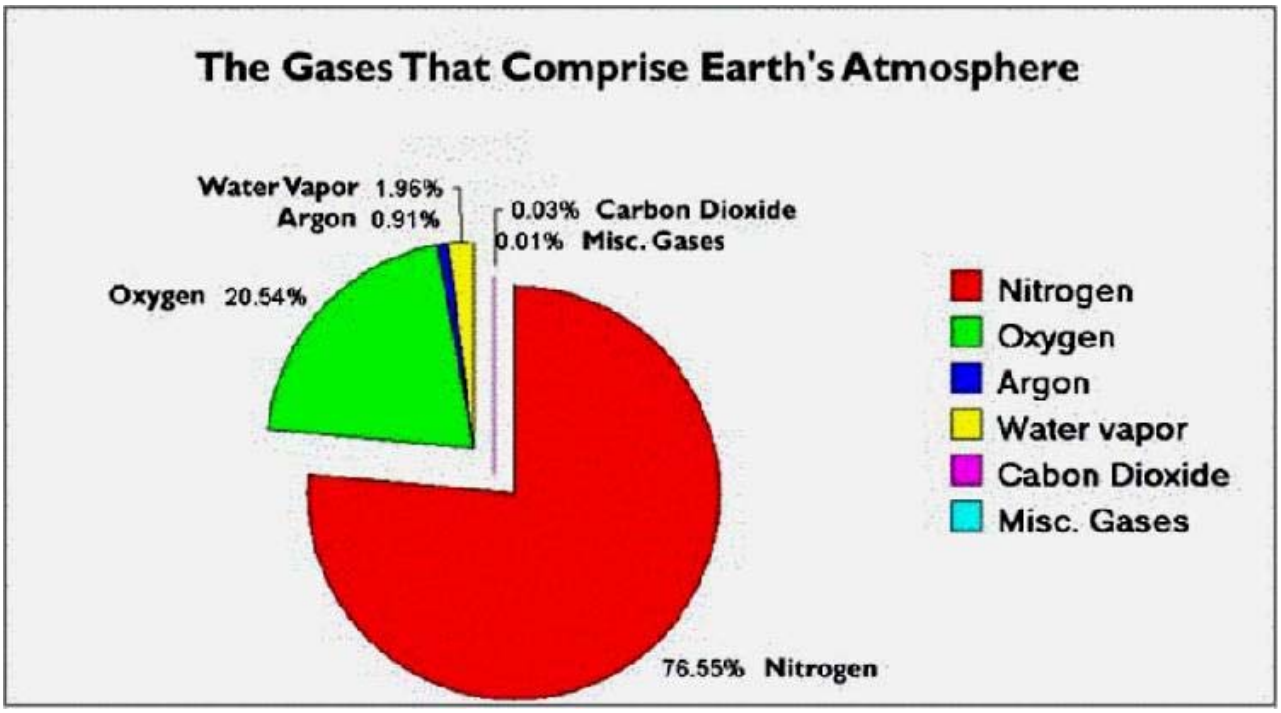
Many scientists say no. Over 31,000 scientists signed a petition saying there's no evidence that greenhouse gases are causing global warming. Eminent climate

scientists such as Richard Lindzen, Roy Spencer and John Christy, who have published hundreds of peer-reviewed papers between them, argue that humans will not have a significant effect on climate. Climate change is still hotly debated among scientists, indicating the science is not settled. To make expensive changes to society or spend a lot of taxpayer money on climate action before the scientists have even made up their mind is rash.

What are some of the points of disagreement among scientists? The 31,000+ scientists who signed the OISM Petition argue that it's wrong headed to label carbon dioxide a pollutant. Carbon dioxide is a natural gas. It's invisible, non-toxic and you can't smell it. If there were no carbon dioxide in the air, every plant in the world would die. Carbon dioxide is plant food. To claim that carbon dioxide is a pollutant goes against biology and common sense. Carbon emissions will improve plant growth and are a welcome addition to our environment.



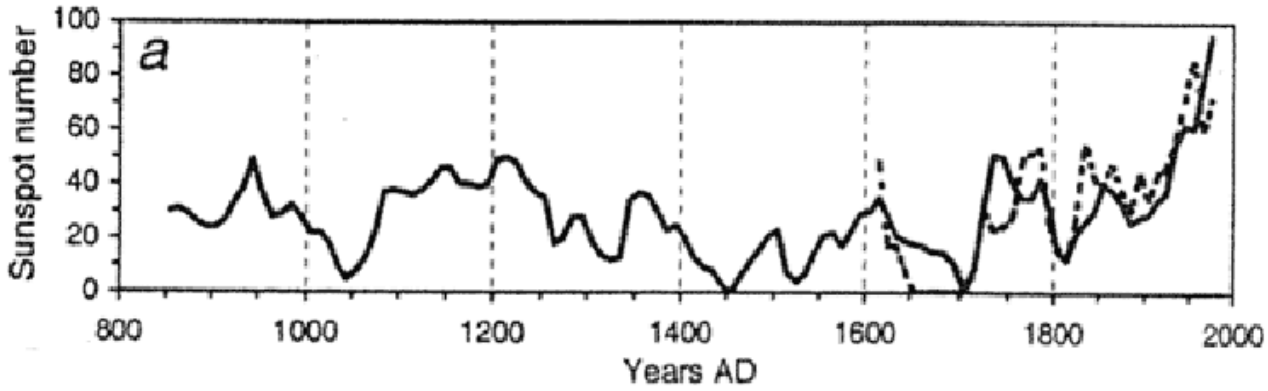
Climate alarmists like to use large, misleading numbers to frighten people. They talk about carbon dioxide levels having increased 40% from pre-industrial levels, as if the current level of 390 parts per million is a high, unusual amount. However, most people don't realise this is only 0.039% of the atmosphere. This is an historically small fraction, with CO2 levels having been much higher in the past. Some 450 million years ago, CO2 levels were a staggering 4000ppm. This is more than 10 times greater than current levels and yet the Earth didn't burn away in a runaway greenhouse effect. During this period, the Earth slipped into an ice age while CO2 levels were much higher than today's levels. To claim carbon dioxide is the main driver of climate is to ignore much of Earth's history.



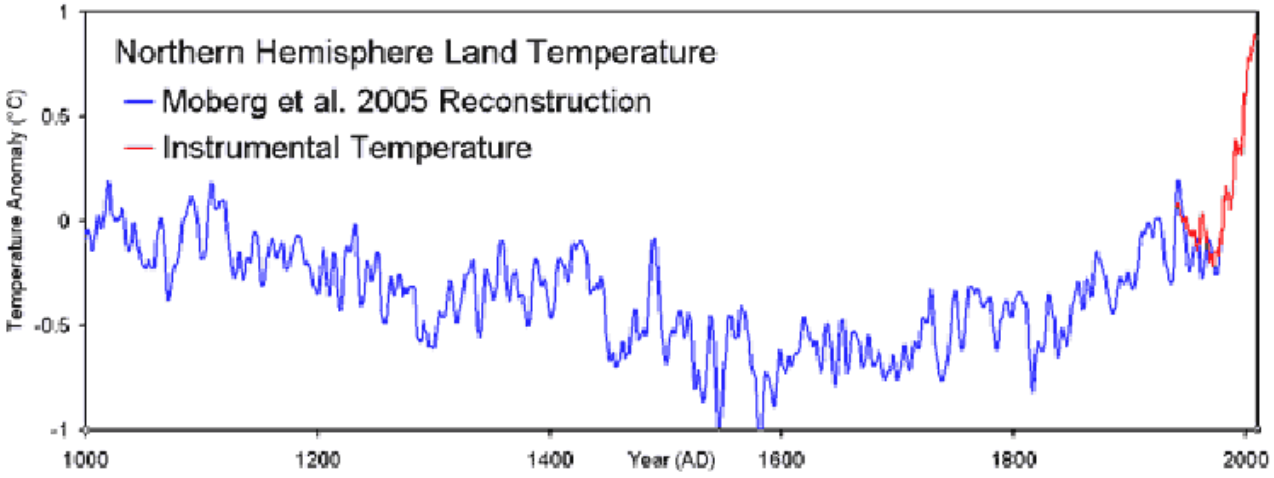
In fact, carbon dioxide is not even the strongest greenhouse gas in the atmosphere. The strongest greenhouse effect comes from water vapor. This is confirmed by measurements that find the warming effect from water vapor is around double the warming effect from CO2 (Evans 2006). It's important that more attention is paid to trends in water vapor, as this is a greater contributor to surface temperatures.

A key driver of climate is variations in solar activity. The sun provides almost all the energy in our climate system. This means our climate is sensitive to changes in the sun's output. When the sun gets warmer, our planet builds up heat. This results in global warming. Over the last few decades, the sun has been unusually warm, achieving its warmest levels in 1,150 years (Usoskin 2005). The unusually warm sun has coincided with an unusually warm Earth. Considering the close relationship between solar activity and climate, its no wonder climate scientists downplay the role of the sun. Much has been made of the hockey stick graph in the temperature record but curiously, no mention is made of the hockey stick graph in solar activity.

Solar Activity measured by sunspot numbers (solid line) and 10Be data (dotted line) from Usoskin 2005.



Reconstructed Northern Hemisphere Land Temperature from Moberg et al. 2005.



Another big driver of climate change is the ocean. Powerful ocean cycles drive large exchanges of heat between the ocean and the atmosphere. The strongest of these cycles is the El Nino Southern Oscillation, which has a large impact on global temperature. Over periods of months, the Pacific Ocean can switch from El Nino conditions to La Nina conditions. This causes cooling which wipes out decades of gentle warming from CO2. More subtle but no less important are longer cycles such as the Pacific Decadal Oscillation (PDO) which switches every couple of decades. Global temperature trends match the PDO closely. In contrast, CO2 rose mid-century while global temperatures fell. The lack of correlation with CO2 and the high correlation with the PDO speaks of a stronger relationship between climate and the oceans. This is not surprising considering the oceans form a major part of our climate system.

So we see many natural drivers of climate change that are more dominant than the invisible trace gas carbon dioxide. Nevertheless, there is a strong push for costly carbon regulation. This is because there is no revenue to be made from blaming climate change on nature. We can't pay a sun tax to control solar activity. We can't put a price on ocean cycles to regulate El Nino. It's a human impulse to desire control over our environment. However, Earth's long history tells us climate change is out of our control.

Click below to move on

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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
There is so much wrong with this article. I'll just address one simple point. I'm sure you will get plenty of takers for the rest.
Greenland was a very small colony. It had grass when it was settled. It had grass when it was abandoned. It has grass now. As explorers discovered more and more coast, they kept calling it Greenland. And so it happens by an accident of history that the entire land hosting that first Viking settlement is now called Greenland. It is

silly in the extreme to suggest that the entirety of Greenland was green in the age of the Vikings. You may as well claim that South Africa's Orange River was full of oranges in the days of the Zulu Wars.

Gunpowder
Just mentioning the OISM petition signed by more than 31,000 scientists is a sign that a lot is wrong with this post! For one, only a very small number of those 31,000 scientists were really working climate scientist. Most were working on totally different subjects.

steveo
Was CO2 that much higher 100's of millions of years ago? Yes. Does this mean that CO2 has no effect? No. Why? This ignores some basic evidence. In the distant past, the Sun was COOLER! Over the Earth's 4.5 billion year life, the sun has increased its heat output by 30%. Extra CO2 was needed to compensate for the fact that the Sun was cooler. Roughly speaking, when we go back in time, CO2 levels need to have been double every 150 million years just to keep temperatures high enough. So, the claim carbon dioxide is the main driver of climate is BASED on much of Earth's history.

Tambourine
Even though it is true that CO2 makes up only a very small amount of our overall atmosphere, you have to take a closer look. Most of the gases in our atmosphere don't have heat-trapping properties. So you can safely ignore inert gases like Oxygen and Nitrogen. Only look at CO2 in comparison to its "buddies", the other greenhouse gases. What you'll find is that the "tiny" amount of CO2 makes up about 25% of those and that is certainly nothing to ignore!

Grand Poobah
The amount of water vapor in the atmosphere depends on the temperature of the atmosphere. If the planet isn't warming, the amount of water vapor won't increase. Water vapor itself doesn't cause global warming. It can only amplify global warming (known as a 'feedback') caused by other factors. Right now, the warming is caused by the increased greenhouse effect. This is due to human greenhouse gas emissions. Sadly this article is riddled with these misunderstandings of basic climate science.

barberella
It's hilarious that this article cites Usoskin 2005. That paper concludes that in the

last few decades, the correlation between sun and climate breaks down. Recent warming must have some other cause. This article's own sources debunk its claim that the sun is causing global warming!

cyborg

What's worse is that anyone who has ever bothered to take a look at solar output graphics would know that TSI only increased by less than 1 Watt/square meter since the start of the Industrial Era. TSI gives a better idea of solar output, rather than just solar spot numbers. Sunspots are good but don't communicate the finer details. The actual forcing due to the sun is less than a fifth of a Watt/square meter. Compare that to the 1.77 W/m^2 increase from CO2. Again, you're telling half the story but not all. Solar hockey stick yes, but it's not going to be scoring any slapshots anytime soon.

g-whizz

"However, what the layperson doesn't realise is this is equivalent to only 0.039% of the atmosphere"

Gee, sounds pretty small doesn't it! ONLY 0.039%. What the article doesn't mention is that is more than enough CO2 to have quite an impact. Laymen don't realise just how MANY molecules there actually are in a chunk of Air. If you take a patch of ground 1 metre square, the air above it up to your waist, 1 cubic metre contains 10 thousand million million milllion CO2 molecules. And that much again in the cubic metre above that, and above that, and... You get my drift. This is more than enough CO2 to have quite an impact. Again, they 'Tell the Truth. But not all of it'!

Tambourine

The full truth about the percentage of CO2 is that over 99% of the atmosphere is oxygen and nitrogen. Both gases are not greenhouse gases. The fact that CO2 is a small percentage is irrelevant to the strength of its greenhouse effect. It's like holding an election in a town of 1000 people where only 10 people vote. Ten may only be a small number but each individual has a large effect. It's the same with CO2. Of course, you don't have to take my word for it. What do measurements find? Both planes and satellites measure heat as it escapes to space. Both find a big bite out of the outgoing heat, at precisely the wavelengths that CO2 absorbs heat. The greenhouse effect is an empirically observed fact.

deeb

If you really don't want to take our word for it, go ask the US Defense Department. They have been behind research into the properties of CO2 among other gases since

WWII. Because its really important to them that they know how light, including Infrared light, REALLY travels through the atmosphere. It matters when you are designing Infrared Air-To-Air missiles, Star-Wars airborne lasers or Early Warning Satellites. So if you think AGW isn't real, go ask them. They spent a lot of money finding out the basic science of it all. And I don't think a bunch of hard-nosed Generals are Tree-Hugging Greenies, do you? If CO2 isn't a problem, why is the Military making plans for the new security threats in a warmer world?

Click below to answer questions

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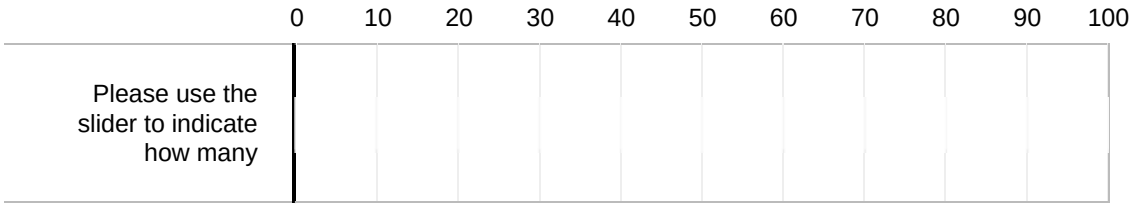
My opinion about a blogpost is completely unaffected by the comments made on the article by others.

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?

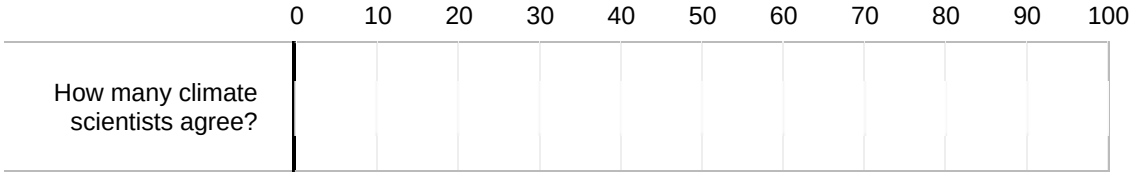
- Strongly Disagree
- Disagree
- Neither Agree nor Disagree
- Agree
- Strongly Agree

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

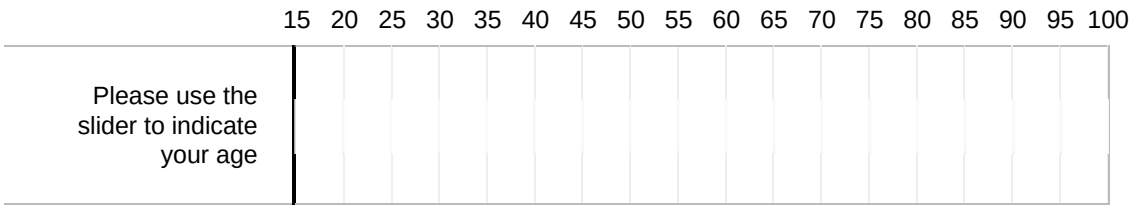
How much do you agree with the above statement?

- 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:

All the information that was given to you in the article "Why we can chill out about global warming" was in fact incorrect and misrepresents the current state of climate science. Please read the following correct content carefully, as you will be asked questions about it later.

FACT: The past warns us that climate reacts strongly to heat trapped by greenhouse gases.

Throughout Earth's history, we've seen dramatic changes in climate, from ice ages to relatively warm periods. This led one scientist to conclude that "...far from being self-stabilizing, the Earth's climate system is an ornery beast which overreacts to even small nudges." But now, we're not just nudging our climate. We are hitting it with a large stick. Humans are emitting billions of tonnes of heat-trapping greenhouse gases into the atmosphere each year. The distant past warns us that our planet will react strongly to the heat trapped by greenhouse gas emissions.

However, a misleading argument is that because climate has changed naturally in the past, long before humans were around, current warming must therefore be natural also.

This logic is flawed. This is like examining a dead body with a knife in its back and arguing that "people died naturally in the past so this death must be of natural causes."

FACT: 97% of climate scientists agree humans are causing global warming.

Several surveys of climate scientists have found that 97% agree that humans are causing global warming. Also, over the last 21 years, 97% of scientific papers that state a position on whether humans were causing global warming agree with the consensus. There is overwhelming scientific agreement that humans are driving recent global warming.

However, some groups try to cast doubt on the consensus. They do this by painting a false picture of disagreement. One example is the argument that 31,000 scientists dispute the consensus. This is based on the 'Petition Project'—a list of 31,000 scientists who dispute that humans are disrupting climate.

The petition uses the tactic of fake experts. These are people who convey the impression of expertise but do not have any experience in climate science. Around 99.9% of the signatories of the Petition Project are not climate scientists. Anyone with a Bachelor of Science is eligible to sign up. The Petition Project is a transparent ploy to foster the impression of disagreement. In reality, there is overwhelming agreement among experts that humans are causing global warming.

FACT: Climate patterns confirm human-caused global warming, rule out the sun.

A number of climate patterns confirm that heat-trapping greenhouse gases are causing global warming. Winters are warming faster than summers and nights are warming faster than days. The upper atmosphere is cooling while the lower atmosphere warms. These patterns rule out the sun as a potential cause of global warming. They also constitute a 'fingerprint' for the fact that humans are causing global warming through greenhouse gas emissions.

Despite the evidence, a persistent myth is that the Sun is causing global warming. People persist in this myth by cherry picking data. For example, they look at times in the Earth's past when temperature and solar activity moved in the same direction. But they ignore recent data.

In the last few decades of global warming, solar activity and climate have moved in opposite directions. Surface temperatures have increased and global temperatures hit the hottest on record in 2010. At the same time, the Sun has shown a slight cooling trend. In 2009, solar activity reached its lowest levels in over a century. If anything, the drop in solar activity has had a slight cooling influence on climate in recent decades.

FACT: Many lines of evidence measure the warming effect of carbon dioxide.

How do we know carbon dioxide is trapping heat? Many lines of evidence confirm that carbon dioxide is causing warming. Satellites measure less heat escaping to space. More heat has been measured coming down from the atmosphere. The warming effect from carbon dioxide is a directly measured reality.

One myth is that carbon dioxide comprises such a small percentage of the

atmosphere, less than 0.04%, that it cannot have a significant effect.

The fact that carbon dioxide makes up a small percentage of the atmosphere is irrelevant. Small amounts of an active substance can have a strong effect. When blood alcohol level reaches 0.05%, which is comparable to the percentage of carbon dioxide in the air, a person is over the legal driving limit.

FACT: Carbon dioxide traps heat, disrupting society and our environment.

As we emit heat trapping gases like carbon dioxide, more heat is being trapped in our climate system. The extra heat is disrupting our environment. Ice sheets are melting, causing sea level rise. Heatwaves are now five times more likely than if global warming wasn't happening. More heat in the oceans is fuel for extreme weather such as flooding rains. The extra heat in our climate system is how carbon dioxide emissions are changing the environment and impacting society.

One myth about carbon dioxide is that it's harmless because it's an invisible gas. The fact that carbon dioxide is invisible is irrelevant to whether it is harmful. In fact, carbon dioxide's invisibility is a key aspect of the greenhouse effect.

Greenhouse gases like carbon dioxide are invisible and hence let sunlight pass freely through the atmosphere, warming the Earth's surface. The warmed Earth then radiates infrared heat at a different wavelength to sunlight. Greenhouse gases absorb this heat. The greenhouse effect happens because greenhouse gases—like glass—let sunlight in, but trap heat from the Earth's surface.

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Click below to answer a few final questions

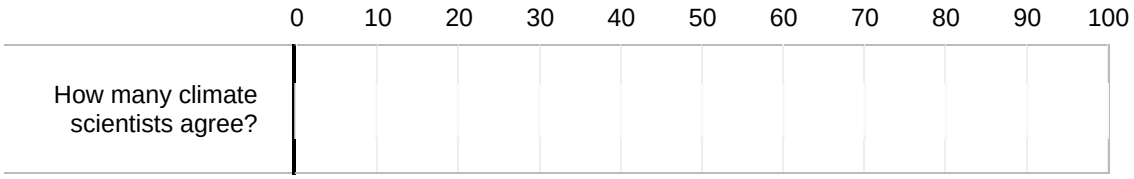
Observed patterns in climate change rule out the sun as a major driver of recent climate change.

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

An overwhelming majority of climate scientists agree that human activity is causing global warming.

- 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?



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