A Simple Proof That Humans Have Affected Global Temperatures: past and present

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ABSTRACT

A proof-theoretic characterization of logical scenarios formed a suitable basis for testing two Ultimate Global Warming Challenge hypotheses regarding climate predictions. The first hypothesis (i.e. surface temperatures are not affected by the production of greenhouse gases) was put to the test with a simple "bare-foot" analysis (a method that most anyone could repeat). This null hypothesis (H1) was rejected since the use of fossil fuels (during construction of roads), can cause long-term increases in surface temperatures. The second hypothesis (H2) involved predicting the impact of future hypothetical scenarios on global economics. A dire prediction from a world-renowned soothsayer indicates a catastrophic event will indeed have a negative effect on the biosphere as well as on per capita income. This global disaster causes flooding of several countries and will result in a reduction in the human population. The global effect of the meteor will put an end to the debate over the potential economic effects of a 1°C increase in average temperatures.

INTRODUCTION

This paper will prove the obvious: humans have increased surface temperatures. Some may be surprised to learn that this is the second time this "cause and effect" relationship has been questioned. The first time humans increased temperatures was during the last interglacial period, some 125,000 years ago. At that time, the leaders of Neanderthal tribes were concerned that frequent use of man-made fire was affecting the sub-surface temperatures and this was affecting the climate (Figure 1). Fire was once a natural event, but once the Neanderthals learned how to make fires, almost every cave had a fire (usually kept going 24/365). Leaders could feel the heat generated by the man-made fires. After several years of making fires (for cooking and hunting game), the leaders began to notice it was taking longer to hike to the snowline. The sea level was rising and winters were getting warmer. The leaders arrived at a consensus: the number of cave fires had to be reduced. Therefore, for the good of the species, hearth fires were prohibited. The making of fire to cook meat and to keep warm was prohibited. Making fires was only permitted by the chief (who had fires going at both his summer cave and winter cave) but anyone else caught making a fire was banished from the tribe. Although the population of Neanderthals declined during the next few thousand years (due in part to eating uncooked meat), the world slowly began to cool. The wise decision to cease making fires was vindicated. The leadership finally had proof that turning wood into energy had indeed warmed both caves and the world (Figure 1).
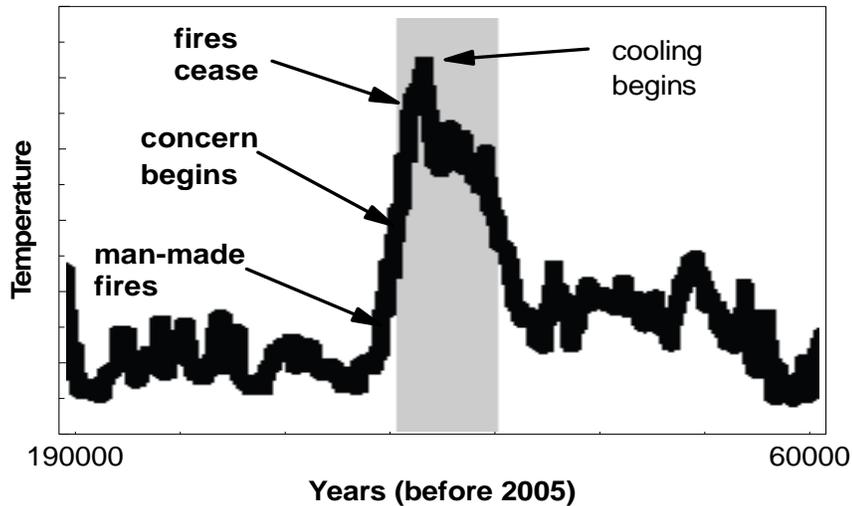
Figure 1. This figure provides proof that Neanderthals were affecting global temperatures about 125,000 years ago. Once a ban on making fires in caves was adopted, the earth began to gradually cool (over a 15,000 year period). The gray band indicates an interglacial period where temperatures were at times higher than at present.

METHODS

Once again our leaders have been asked to prove that humans are warming the globe. Why any proof is necessary is unclear. Any child who watches television knows that humans control the climate; no hypothesis testing is required. All that is needed to convince the next generation of impending doom is a computer, some software, film of melting ice, and a press release with someone stating that "our climate is spinning out of [our] control." However, when it comes to convincing skeptical scientists, it can be difficult to prove anything with reams of computer printouts that forecast changes in weather (especially when software has to be continuously updated with additional or modified variables). For example, George Box said that "all models are wrong, but some are useful." As one might expect, this skeptical view does not sit well with some computer modelers. For example, one climate modeler said that "my computer model is correct, it is the world that is wrong."

The forecasts of competing complex climate models (or should I say scenarios?) can vary by as much as 400%. Therefore, a few researchers will make up probability values (P-values) in order to increase the level of credibility. Since skeptics are not persuaded by made-up P-values, I took a different approach to hypothesis testing. Therefore, I decided to use the KISS method (i.e. Keep It Simple South). To be able to hold up to skeptics (ie. those who adhere to the scientific method), the tests must be repeatable.

Hypothesis 1 (H1): Manmade emissions of greenhouse gases do not discernibly, significantly and predictably cause increases in global surface and tropospheric temperatures along with associated stratospheric cooling. To test H1, I used a two-prong approach. First, I examined the pre-historic pattern of temperature and CO2. Second, I established a simple test that could be replicated by most anyone.

Hypothesis 2 (H2): The benefits [from using fossil fuels] equal or exceed the costs of any increases in global temperature caused by manmade greenhouse gas emissions between the present time and the year 2100. All global social, economic and environmental costs and benefits are considered.

Or, stated in another way, benefits [2007-2100] derived from use of fossil fuels exceed the costs associated with the precautionary principle (i.e. ceasing the use of fossil fuels). A test of this hypothesis requires a GIGO, soothsaying approach [1].

RESULTS

The First Hypothesis

More than 1,000 Nobel laureates (IPCC authors) say that CO2 drives temperature increases. They claim that an increase in water vapor is not the main driver, but that increases in CO2 will result in a measurable warming of the globe (e.g. a computer generated estimate of 1.66 watts/m2 of forcing from 1750 to 2007). But in pre-historic times, which came first: a change in temperature or a change in CO2? Theory A suggests CO2 increases caused temperatures to rise (i.e CO2 is the independent variable; Figure 2) while the alternative Theory B states that temperature was the independent variable (and surface temperature fluctuations caused CO2 levels to fluctuate; Figure 3).

If CO2 was the main driver during pre-historic times, then a 100 ppm increase resulted in a 10°C increase in temperature, (Figure 2). According to this simple linear model, a value of 380 ppm would mean the world is now at least 10°C cooler than it should be for that carbon dioxide level. More convincingly, ice-core data show that temperature increases precede CO2 increases by about 800 years. Since these two pieces of evidence do not agree with our leaders' belief system, Theory A is rejected because it is entirely too simplistic to be believable by most funding agencies.

Theory B, on the other hand, shows that as the Earth warms, atmospheric CO2 levels increase and when the Earth cools, CO2 levels decline. With temperature as the driving factor (Figure 3), the current level of 380 ppm simply means that CO2 is greater than predicted using pre-historic data. Therefore, Theory B is not rejected since it agrees with our leaders' belief system. This proof-theoretic characterization explains why I did not rely on computer models or CO2 data to test H1. Instead of building a complex model, I collected data directly from the surface [2].
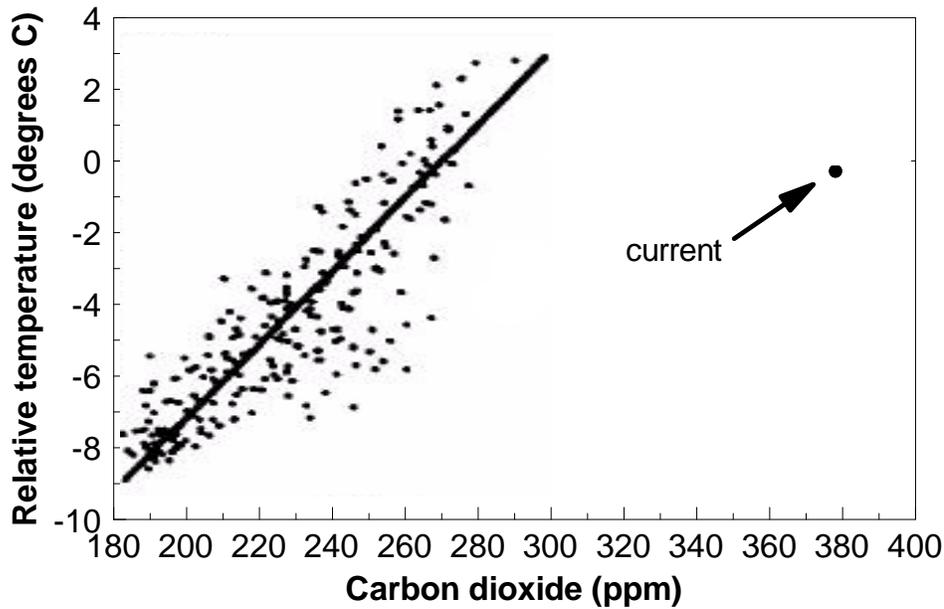
Figure 2. Theory A indicates CO2 is the independent variable (x-axis) and temperature of the earth is the dependent variable (y-axis). The linear regression is y ≈ -27 + 0.1x. This figure was adapted from Kirchner [3]. Kirchner stated that "The correlations in the ice core data suggest that, for the current composition of the atmosphere, current temperatures are anomalously cool by many degrees." These data suggest the Earth is at least 3°C cooler than expected using prehistoric data.
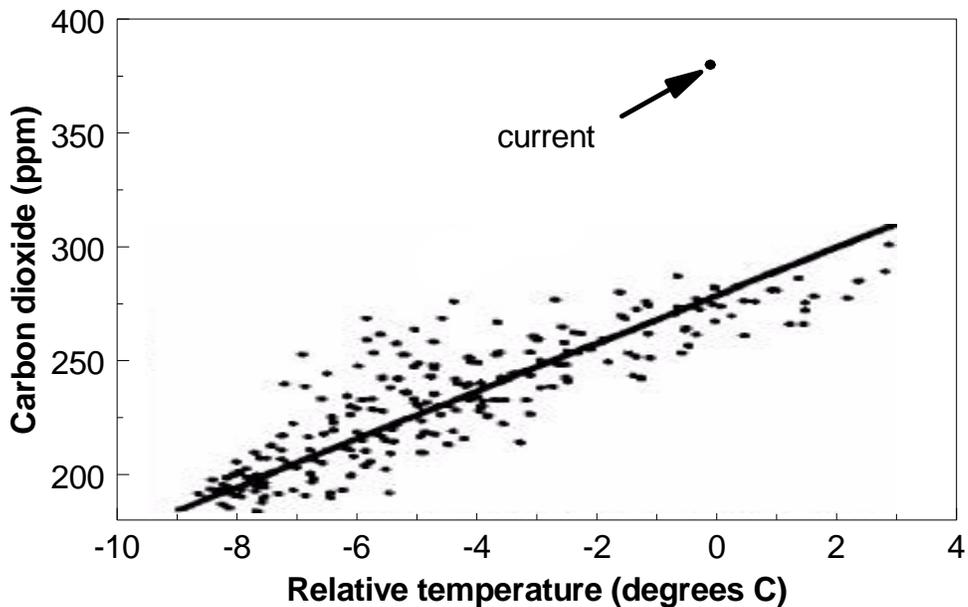

Figure 3. Theory B indicates temperature is the independent variable (x-axis) and CO2 is the dependent variable (y-axis). This figure suggests the atmospheric content of carbon dioxide is about 100 ppm higher than it was in prehistoric times (when the Earth was just as warm as today). The linear equation is: y ≈ 270 + 10x.

Surface temperature increased by use of fossil fuels

This past summer, I took off my shoes and walked barefoot around my yard. I decided to check my mailbox and started to walk on the black asphalt road. I soon realized my soles felt like they were on fire and quickly hopped back to the dirt shoulder. I repeated this trial for five days with similar results. However, for some reason the road did not seem as hot on cloudy days. Results from this trial were used to reject the null hypothesis (H1).

Emissions of greenhouse gas (e.g. water vapor) occurred when they built the asphalt road. In the US alone, it has been estimated there are more than 260,000 square kilometers of asphalt (i.e. heat sinks). Throughout the world, greenhouse gases are produced during the construction of heat sinks. For example, even Masdar (the first "carbon-free city") will be constructed with equipment that burns fossil fuels. The key to rejecting H1 is admitting that construction of "heat islands" depends on the production of greenhouse gas emissions. In regards to the stratosphere cooling, of course it is cooler! As the troposphere warms up, it expands and gets higher. As a result, the stratosphere is further away from the Earth's surface and is cooler.

The Second Hypothesis

Some predict that a 1°C increase in global surface air temperature will have a positive effect on the economy of China, the Middle East, Europe and North America [4]. This amount of warming might increase Gross International Product (GIP) by 2%. However, testing the second hypothesis involves comparing two views of the future. Will switching to carbon-free energy sources result in a -2% or +4% change in GIP by 2100? To arrive at an answer requires a soothsayer to predict what might occur 100 years into the future. Unfortunately, few living today can accurately predict two days into the future. If anyone living today could make accurate predictions, they would be a bazillionair.

Some Nobel laureates are willing to soothsay and predict economic doom over the next 50 to 100 years. In contrast, scientists typically confine themselves to testing a null hypothesis. Most hypotheses do not require calculating hypothetical benefits for 100 years (since the accuracy is only known after the researcher is dead). In fact, unlike hurricane predictors, many scientists are not willing to make short-term predictions. They know reputations suffer when a weather prediction (e.g. 85% chance of having 7 to 9 hurricanes) proves to be wrong after just 4 months; or when the date for world doom proves to be false after only 5 years [5]. This explains why many climate doomsayers now make predictions of events that might (not) occur long after they are dead.

However, a small number of academicians are willing to bet money (and their reputation) on future events. The best way to see how confident someone is in their computer model (or belief system) is to make a substantial bet on a future event that can be measured (typically within a decade or two). For example, a few years ago I made a 5-year bet with Dr. Julian Simon on the price of wood [6]. In 2001, he sent me a check for $1,000. Later, I made a 9-year bet with an economics professor on the price of oil (and I expect to get a >$1,000 check in 2010). Recently, I proposed a $500 bet on the highest

temperature in Alabama (from now until 2020) but the doomsayer declined my bet. Although I have some success with my predictions, in no way can I predict either economic or social benefits 100 years into the future. To predict long-term future events, I need help from someone who has made accurate predictions that span centuries, even millennia. I therefore consulted a well-known book that was published in 1555 [7]. When it comes to forecasting doom, Nobel laureates do not hold a candle to Nostradamus.

According to Nostradamus, the Earth is currently experiencing an interglacial period (Figure 4). Interpretations of quatrain XII:43 suggest the next cooling will begin in about 3,000 years (sooner than predicted by most computer models). However, during the 21st century, much of the Earth's surface will be destroyed by a meteor. The impact causes flooding of many great countries (quatrain I:69). This event reduces population pressure and eliminates taxes. Therefore, funding of climate change research ceases (quatrain XII:89). Surviving scientists switch from trying to predict the percentage of global warming caused by water vapor… to looking for food and shelter. The devastating global effects of the meteor's impact put a stop to wealthy individuals who worry about a 30 to 50 cm/century increase in sea level. Those who were no longer adaptable (i.e. accustomed to the benefits of a functioning infrastructure of fossil fuel distribution) did not survive. In contrast, "primitive" tribes that are proficient in living off the land survived. Therefore, the meek inherited the earth. H2 was rejected since those that currently "benefit" from using fossil fuels are the same ones that die out after the impact (since they are no longer able to live off the land).
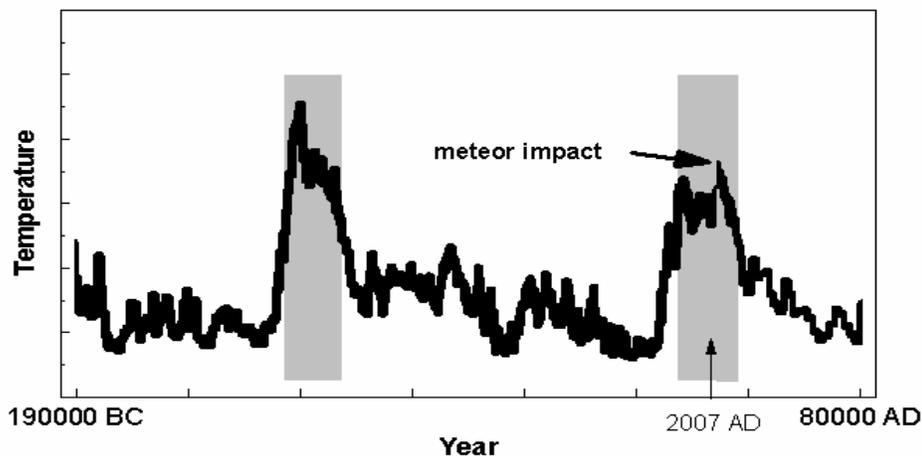

Figure 4. The temperature of the earth is lower during glacial periods and warmer during interglacial periods (represented by gray bars). Pre-2007 data were obtained from ice-cores while post-2007 data were obtained from quatrain XII:43 [7]. This graph clearly shows that humans have control over global temperatures. About 125,000 years ago, humans were increasing sub-surface temperatures (by making fires in caves). Today, humans are increasing surface temperatures by using fossil fuels to construct heat-islands. The impact of a meteor during the 21st century will result in flooding of many countries and will greatly lower the human population. This global tragedy triggers a period of cooling.

CONCLUSIONS

(1) Burning wood in caves by the Neanderthals increased sub-surface temperatures 125,000 years ago.
(2) Replacing forests with heat-absorbing pavement has increased surface temperatures.
(3) Use of fossil fuels in the construction of asphalt and concrete roads will result in the production of water vapor (a major greenhouse gas).
(4) A meteor impact will have a devastating effect on the global environment and will trigger global cooling. Similar types of impacts have occurred in the past (resulting in population declines of numerous species). Survivors (after the next impact) will have more important things to worry about than a 3 to 5 mm/year increase in sea level.
(5) Since 16,000 BC, the sea level has increased by about 130 meters. During this period, nomadic people living in North America adapted by moving to drier land.
(6) Today, many wealthy individuals in North America have lost their ability to adapt to a changing environment. Many fear a small increase in sea level (50 cm increase/century) might decrease the value of their beachfront condominium. Some now would rather live below sea-level than rebuild on higher ground.
(7) "You can fool some of the people all of the time, and all of the people some of the time, but you cannot fool all of the people all of the time." Abraham Lincoln
(8) "To know that you do not know is the best. To pretend to know when you do not know is a disease." Lao Tzu

ENDNOTES

[1] GIGO = Garbage In- Garbage Out

[2] Experts can be grouped into two categories: those who believe in complex models and those who believe in data.

[3] Kirchner, J.W. Tol, R.S.J. 2002. The Gaia hypothesis: fact, theory, and wishful thinking. Climate Change 52: 391-408.

[4] Tol, R.S.J. 2002. Estimates of the damage costs of climate change: Part 1: benchmark estimates. Environmental and Resource Economics 21:47-73.

[5] Noone, R.W. 1982. 5/5/2000: Ice: The Ultimate Disaster. Three Rivers Press, New York.

[6] http://www.sfws.auburn.edu/sfnmc/web/oilbet.html

[7] Nostredame, Michel de. 1555. *Les Propheties* Macé Bonhomme, Lyons, France.

[8] http://www.creators.com/comics/1/11297_thumb.gif

[9] http://www.schwadroncartoons.com/images/2007/may12.gif