

06 August 2012: Below is a much abbreviated Summary of one of Dr Glassman's papers, put online by the webmaster of Tech-Know-Group for the purpose of generating interest in this scientist's extensive work. Please follow the links for the full versions which include graphics and hundreds of blog comments.

<http://www.rocketscientistsjournal.com/2010/03/sgw.html> plus see also Dr Glassman's

http://rocketscientistsjournal.com/2009/03/internal_modeling_mistakes_by.html and his

http://www.rocketscientistsjournal.com/2006/10/co2_acquittal.html

THE CAUSE OF EARTH'S CLIMATE CHANGE IS THE SUN

THE FINGERPRINT OF THE SUN IS ON EARTH'S 160 YEAR TEMPERATURE RECORD,
CONTRADICTING IPCC CONCLUSIONS, FINGERPRINTING, & AGW

SOLAR GLOBAL WARMING

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ABSTRACT

Solar energy as modeled over the last three centuries contains patterns that match the full 160 year instrument record of Earth's surface temperature.

I. INTRODUCTION

Earth's climate responds to solar energy dominantly as a mechanical tapped delay line, and so is sympathetic to certain delays in the solar output, to reinforce some but suppress others. This phenomenon occurs first because the atmosphere is a by product of the ocean. The ocean dominates the climate response because it is dark to absorb short wave radiation, because it has a high heat capacity, and because ocean currents cause delays to neutralize or reinforce solar patterns.

The Intergovernmental Panel on Climate Change (IPCC) asks the question, "*Can the Warming of the 20th Century be Explained by Natural Variability?*" IPCC's answer can be read as affirmative, but with no more than 10% certainty. AR4, FAQ 9.2, p. 702. IPCC's data on which it relied show that the answer is "Yes" with high confidence, and that the cause of the variability is the Sun. IPCC's own data analysis techniques, applied more frequently and its own preferred data, reveal the patterns, and reveal IPCC's error in computing the radiative forcing of Total Solar Irradiance (TSI).

IPCC's Fatal Errors, the previous paper in the *Journal*, showed a number of errors within IPCC's Anthropogenic Global Warming Model, each of which was sufficient to invalidate AGW based on internal errors. That paper relied on no new data, nor any alternative in data analysis or modeling by IPCC, but the result was negative with respect to the climate model. This paper relies on IPCC's preferred data expressed in its Reports, but is affirmative, advancing an alternative model for global warming in which the Sun is the cause.

This Solar Global Warming model is a competing model to AGW, based on the same data. It necessarily contradicts several more arguments, claims and derivations made by IPCC. Each is analyzed here.

This paper in part confirms and extends the analysis of Dr. Nicola Scafetta. (See references.) The starting points and end points are similar, but this study adheres to IPCC's data and methods to debunk IPCC's model on its own terms, and to minimize any tendency to produce an alternative and competing climate model from the infinity of possible candidates.

IPCC's modeling is far less mathematical than Scafetta's, and relies on patterns evidenced in graphs rather than computed correlation values. To be sure, either graphical or computational correlation methods can guide the creation of scientific models, but in the end, models must produce fully quantified predictions to compare with scientific facts. The patterns shown and discussed in this paper are exclusively objective.

The United Nations Environment Programme (UNEP) says,

The IPCC was established by UNEP and WMO [World Meteorological Organization] in 1988 to assess the state of existing knowledge about climate change: its science, the environmental, economic and social impacts and possible response strategies.

<http://www.unep.org/Documents.Multilingual/Default.asp?DocumentID=43&ArticleID=206&l=en> .

Instead, IPCC understands its charter to be

*to assess on a comprehensive, objective, open and transparent basis the scientific, technical and socio-economic information relevant to understanding the scientific basis of risk of **human-induced climate change**, its potential impacts and options for adaptation and mitigation.* Bold added, Principles Governing IPCC Work, 10/1/1998.

In its first decade, IPCC inserted the assumption that "*human-induced climate change*" exists, and so elevated that conjecture above "*comprehensive, objective, open and transparent*" investigation.

Accordingly, IPCC implements its model, committed to the radiative forcing paradigm, in a number of individual global climate models, selected and tuned by IPCC for agreement with its conjecture that Earth's climate must be caused by man through his CO₂ emissions. By application of that flawed and biased model, IPCC determined that the Sun is not the cause of Earth's climate variability.

IPCC claims to stimulate science, not actually to do science, but to define the problem and then to rely on the "*best available science*", meaning that agreeable science published in peer-reviewed publications. AR4, ¶1.2 *The Nature of Earth Science*, p. 95, below. However, its investigators indicate that they accept as peer-reviewed only material from journals which publish no articles skeptical about anthropogenic climate change. The investigators reject other journals and other media, and boycott, intimidate, or ridicule editors and sources not in the camp.

At the same time, the recent Himalayan glacier incident demonstrates the willingness of IPCC to rely on a student paper, based solely on that paper's favorable support of IPCC's conjecture.

IPCC has influenced genuine papers that have negligible bearing on the anthropogenic conjecture to be salted with immaterial phrases to acknowledge dutifully the significance of anthropogenic global warming, and to reference immaterial or biased papers that form a network for a belief system. So IPCC has isolated its work from scientists who respect the virtue of skepticism, from public criticism, and from the review of its superiors in science.

IPCC is correct to look for physical reasons for its modeling, but seems to confuse the real world with its models. The real world has no coordinate systems, parameters, or values. It has neither infinities nor infinitesimals. It cannot have the properties of scale or linearity. These are all manmade concepts that lead to valid models, that is, models with the ultimate scientific property of predictive power. These are all properties of models of the real world.

Mathematical models have poles, meaning singularities at which a dependent parameter becomes infinite or undergoes perpetual oscillation. These are instabilities, and a stable system or a stable state is always finite, and any oscillations are damped. The most violent of natural phenomena, supernova in astronomy, and volcano eruptions in geology, are the largest witnessed events in their fields, but in the end are finite in energy, in time, and in space. Man has observed nothing infinite or infinitesimal. Things become infinite in models that employ rates or densities in which the denominators vanish. Nature doesn't give a fig about man's models.

IPCC is not particular enough about definitions, as discussed above or in the *Journal for equilibrium, residence time, cloud albedo*, and now for *stable or linearity*. It defines nonlinear as the absence of a "*simple proportional relation between cause and effect*." AR4, Glossary, p. 949. The word *simple* qualifies and blunts a promising definition. But the existence ever of cause and effect is an axiom in science, notwithstanding some painfully obvious counterexamples. Linearity has a precise definition in mathematics and system theory. A system is linear if the response to a linear combination of inputs is that same linear combination of the individual responses. What might be linear in, say, cylindrical coordinates, becomes nonlinear in Cartesian coordinates. The Beer-Lambert Law states that absorbance by a gas is linear in the product of concentration and the distance traveled (from the probability of a collision), but it also expresses gas radiative forcing as the non-linear complement of an exponential in gas concentration. A linear relationship in the macroparameters of thermodynamics is likely nonlinear on smaller scales, that is, in mesoparameter or microparameter spaces. Linearity is a state of mathematical being, and is not continuously measurable. It exists or not. A system cannot be "*highly nonlinear*". That "*the climate system exhibits highly nonlinear behavior*" (AR4, Appendix 3A, p. 336) is doubly meaningless.

Similarly, although the climate system is highly nonlinear, the quasi-linear response of many models to present and predicted levels of external radiative forcing suggests that the large-scale aspects of human-induced climate change may be predictable, although as discussed in Section 1.3.2 below, unpredictable behaviour of non-linear systems can never be ruled out. TAR, ¶1.2.2 *Natural Variability of Climate*, p. 91.

Nothing can be highly nonlinear, and nothing in the real world can be nonlinear. Models, on the other hand, will always be linear or not. Furthermore, linearity is not a prerequisite for predictability as IPCC suggests. Radiation transmission through a gas is nonlinear in concentration or distance as predicted by the Beer-Lambert Law. Outgassing of CO₂ from the ocean to the atmosphere is nonlinear in atmospheric partial pressure according to Henry's Law.

Oceans, because of their mass, their heat capacity, and their color, are the dominant mechanism of Earth's energy balance between the Sun and space. The atmosphere as a reservoir plays a minute role, and is well-represented as a byproduct of the ocean. And the ocean is the distributor of the carbon cycle, the hydrological cycle, and the energy cycle. The ocean's complex patterns of circulation across the surface, and between the surface and the deeper ocean, produce a pattern of delays, with some cycle times exceeding a millennium. These are evident in the concentration of CO₂ cross-correlated with temperature. Consequently, temperature might be best modeled as a set of relatively narrowband accumulators of solar energy. An analog to this process in electronics and signal processing is the tapped delay line.

The Sun is the only significant cause for Earth's climate to have ranged from a few degrees Celsius to a maximum of about 17°C (an anomaly range of about -9°C to 3°C). The new results here constitute the only evidence showing more specifically that the Sun is also the cause of the observed variations of Earth's surface temperature over the last century and a half, the entire instrument record, and more than likely the cause over the geological record.

This model for the Sun is an *a posteriori* model, meaning that it is based on experiment, as was the Wang, et al. model. It provides opportunities for further improvements. For example, a modeler might discover a better filter than the trend, especially one based on physical processes on Earth, in the fashion that Wang, et al. matched experimental data with a randomized collection of solar eruptions called Bipolar Magnetic Regions (BMRs). A sum of mutually orthogonal (uncorrelated) waveforms might provide a superior filter, and a coefficient for each to best fit Earth's temperature record. Regardless, a fine model for Earth's Global Average Surface Temperature is immediately available that fits well within the uncertainty of measuring and estimating the unmeasurable macroparameter of the global average surface temperature, and the uncertainty in the TSI model.

A model in which the Sun impresses its energy pattern on Earth's climate is plainly inconsistent with IPCC's three-pronged argument for patterns of human activities to have imprinted the observed warming. IPCC urges (1) that the depletion of atmospheric oxygen matches the rate of increase of atmospheric CO₂, (2) that the decline in the isotopic weight of atmospheric CO₂ matches fossil fuel emissions, and (3) the sudden rise in gas concentrations and temperature match the onset of the industrial era, the family of hockey stick graphs. Of these imprint patterns, only one is strong, extensive, complex, and genuine: the Sun's fingerprint on Earth's temperature.

From IPCC's standpoint, its hockey stick constructions are too good not to be true. They support its logic of the unprecedented proving causation. Of course, and lest any further misunderstanding arise, the proposition is neither logical nor a theory. Unprecedented establishes nothing but odds, and proof is for mathematics and logic, not science. The Sun does not account for the hockey sticks, those IPCC artifacts of data mishandling, whether intentional or a consequence of IPCC's admitted "*low level of scientific understanding*."

IPCC urges emergency action from world government to stop global warming, because the present climate is already the warmest in over a millennium and is increasing rapidly due to man's CO₂ emissions. Founded in 1988 specifically to advance climate science, later interpreted by IPCC as a charter to promote AGW, IPCC's crowning achievement is featured as the 1st graph of the 1st section of its Third Assessment Report, Climate Change 2001, *Summary for Policymakers*. TAR, p. 3. It is the history of global average temperatures for the past millennium, the Hockey Stick. The Handle of the Stick is the benign, even cooling, past, and the Blade is the unprecedented rapid rise in the 20th Century.

IPCC's hockey stick charts comprise its "unprecedented argument" by which it hopes to persuade the public that a catastrophic global warming, caused by man through his greenhouse gas emissions, is underway. It floats on a raft of logical fallacies. What is unprecedented in these records, the brief blades of the hockey sticks, cannot be said never to have happened, but only that they have yet to be sampled among a small number of widely spaced ice core samples, or are yet to be estimated from highly uncertain proxy reductions. What is unprecedented in our observations does not establish impossibilities before man. Having gases and temperatures appear to rise together is a correlation, and elementary in science is that correlation does not imply cause and effect. In the theory of causation, the lack of a correlation rules out a cause and effect, and a lagging process cannot be the cause of a leading process. Graphical appearances are not measures of correlation, much less estimates of leads and lags.

While man must be ruled out as a factor in climate pre-1750, that adds no weight to the hypothesis that he must be a cause of change post-1750. *Could be* does not imply *is*. Accepting a hypothesis by eliminating some but not all competing plausible hypothesis is an error in causality, sometimes known as the *hidden factor fallacy*. Man cannot be accepted as the cause unless the Sun is ruled out, and the Sun cannot be ruled out based on a constant albedo model until albedo is shown not to vary in some significant, dependent way, directly or indirectly, on solar activity.

The imprint of the Sun is on Earth's climate. The signal is unusually strong among the class of all climate signals, matching the entire record of global average surface temperature based on data from instruments. The imprinted signal is not visible in the broadband, Total Solar Irradiation model, but can be seen by filtering, much as spectral analysis reveals significant sinusoidal frequency components. And what is significant depends not on the source – the Sun -- but on the receiver – Earth. Moreover, because the problem is thermodynamic, and the medium, heat, has capacity but not inertia, temperature will not contain natural frequencies to resonate with a source.

The ocean dominates the natural climate processes on Earth, and its three dimensional currents have the effect of storing and releasing energy and gases after a number of finite delays. According to this model, Earth should selectively reinforce and suppress finite delays within the structure of solar radiation. Application of the most elementary finite-time filter, the fixed time, running trend, reveals a pair of components of solar radiation, one major (S_{134}) and one minor (S_{46}), that combine linearly in the ratio of 5:1 to match Earth's temperature history as known by instruments.

On the scale of the instrumental record of Earth's surface temperature over the last 160 years, humans have had no effect, and the Solar Global Warming model advanced here would predict none. To the extent that IPCC might presume that human activities have altered Earth's temperature record, the effect is imaginary, absent some sentient extraterrestrial force that managed to keep the Sun synchronized with Earth's average surface temperature.

IPCC claims to have evidence of the fingerprint of man on Earthly gas and temperature processes are unsubstantiated. Each has a basis in graphical trickery. Two of these claims falsely demonstrate relationships known mathematically: the rate of CO₂ increase compared to the rate of O₂ decrease, and the rate of fossil fuel emissions compared to the rate of decrease in the isotopic weight of atmospheric CO₂ based on mass balance principles. Other claims rely on investigator-manufactured data from ancient records blended into modern records, where the former are averages by a process requiring a year to centuries, while the latter are relatively instantaneous. The records requiring a year are tree ring reductions, while the others are measurements from ice cores that average gas concentrations over a range of couple of decades to a millennium and a half.

Just as the Earth's temperature record following the Sun eliminates humans from the climate equation, so is the fate of the greenhouse effect. To the extent that the greenhouse effect is correlated with Earth's temperature history, the cause must link from the Sun to the greenhouse gases. The alternative is the silly proposition that solar radiation variations might be caused by changes in greenhouse gas concentrations.

AGW is dead. Here are some topics for the post-mortem. Forensic analysis of proxy reductions for correlations caused by data set sharing, and subjective smoothing into the instrument record. Forensic analysis of whether proxy temperature reductions have any validity. An à priori model for the tapped delay line representation of climate based on ocean currents. An à priori model for cloudiness as it responds to short wave radiation.
