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Climate Change Science & Propaganda

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Abstract

This article addresses the relationship between science and propaganda using the Climate Change controversy as a study model. The United Nations Intergovernmental Panel on Climate Change (IPCC) is the recognized leader on this model issuing multiple Assessment Reports. This review begins with a discussion of the basics—what is propaganda and how does it work, followed by whether the IPCC adopted or rejected it. Next explored is how propaganda can be seamlessly fused into "report writing" in a way that arouses and makes interesting humdrum details. Some unexpected results emerged from current and historical observation data involving the Greenhouse theory, CO_2 sources, ocean pH, sea levels, and ice balances. The final section confronts whether "a point of view" constrains objectivity in favor of outcome. The overall conclusion is that the earth is *boringly* healthy.

Keywords

Climate Change, IPCC, Propaganda, Greenhouse Theory, Ozone, Ocean pH, Sea Level, Ice Balance

1. Introduction

This article delves into the thorny topic of science and propaganda. In the ideal world, science should be objective, honest and fact oriented. But that is not the world we live in and it never has been. The two are interwoven in a fabric of power and money. Addressing this relationship is unpleasantly necessary to have any chance of uncovering accuracy. The climate change controversy cries-out for analysis, and the United Nations Intergovernmental Panel on Climate Change (IPCC) takes front stage.

2. What Is Propaganda and How Does It Work?

Propaganda is a manipulation tool focused primarily on emotions. It has little to do with truth or facts and everything to do with persuasion and motivation. Whether that is good or bad, depends on whether you feel science

should be boringly independent and often ignored, or entertainingly deceptive but viewed by many. If the initial reaction is emotional, it's probably propaganda.

Some techniques are apparent. "Name calling", "catchy phrases", "must act immediately", "transfer" or "change the topic" and "repetition" are easy to spot. Name calling like, skeptic, denier, alarmist, etc. is nothing more than a tool to tickle emotions.

Others take more effort to spot. Calling an "opinion" a "fact" has become pervasive because of influences from the entertainment world. "Exaggeration" overly embellishes one feature. Lawyers blow up photographs to make an injury look worse. "Misdirection" is more hidden and remarkably convincing. The left hand of a magician draws attention while the other hand camouflages a surprise.

The use of the words "man-made" and "your fault" are propaganda tools. Most people instinctively feel responsible for something that went wrong. A football fan feels guilty if his team's loses because he forgot to wear his lucky shirt.

"Guilt" or "instilling fear" of a cataclysmic event is the strongest because it triggers the deepest emotions. It has been used by every nation, ancient and current, to manipulate. Animal sacrifices to change the weather have been carried out in most ancient civilizations. The media publishes bad events because it's watched. The more outrageous, the more it is repeated. News that there is "nothing to worry about" or it's "another nice day", is usually ignored. A Pew Research Center [1] study showed that public interest was highest in "war and terrorism" and "manmade or natural disasters" with science and technology coming in last. Why? Emotions.

2.1. When Propaganda Appears

Not reading or watching television whenever propaganda pops up may lead to blissful ignorance, but active engagement is better when supported by awareness. "That horse bucks every time", (facts) will likely lead to a better decision over statements about its "beauty and fame" (propaganda.)

Propaganda does not mean that it's always bad. "stop smoking ads" have produced beneficial results, while "eliminating weapons of mass destruction" may not have a positive outcome, albeit the catchy phrase sounds good.

2.2. IPCC's Position on Propaganda

IPCC Organizing Papers dictate its policies. The organization wrote a seven page manifesto (Guidance Note for Lead Authors) on propaganda techniques to guide authors in writing reports, [2] which was used and adopted ([3], p. 1¶2), ([4], pp. 30¶7, 34¶4.2) ([5], pp. 1¶2, 45¶4.2) All IPCC documents are available on its web site. This manifesto plays a significant and key role ([5], p. 4¶5.4). Members are encouraged to undergo media training ([5], p. 39¶22). Whenever low probabilities appear, climate consequences (emotions) with high certainty are to be included [2]. Authors are to list their positions with positive words, and state their findings as if they were "statement of facts without using uncertainty qualifiers" [2]. Expressions showing lack of knowledge must be avoided [2]. Where a zero probability negative to their position appears, (Honey, I will lasso the moon and pull it closer.) the author can use the word "unlikely" as opposed to impossible ([2], p. 3). When communicating low probability the authors are cautioned to use "calibrated language" [2] and if the author chooses to use language of low probability, then "the reasons for their presentation should be carefully explained" *i.e.* a written justification is needed [2]. Governments may review and comment on the reports before approval [6].

The US Climate Change Group mirrors the IPCC manifesto plus adds another 89 pages. The title describes the content—"Best Practice Approaches for Characterizing, Communicating and Incorporating Scientific Uncertainty in Climate Decision Making." [7]. At page 8 it recommends that when communicating uncertainty, one must use psychology and decision science [7]. Spending a billion dollars on more research would likely result in their opinions being less accurate ([7], p. 58). In most cases formal analysis (fact based science) plays a lesser role than emotions and feelings ([7], p. 65), open ended interviews (mock trials) are recommended ([7], p. 68) to test the effectiveness of the message. Assuming a result, and then working backwards is an effective tool in making critical decisions ([7], p. 74).

The IPCC members are obligated to uphold, maintain, and implement its principles and promote its products, and act in accordance with the manifesto ([3], p. 24¶8). They must proactively communicate with the media and correct any incorrect representations that may be damaging ([3], p. 33¶2&3). Bureau members must not express any views beyond the scope of the reports ([3], p. 36¶6). All members, including all lead authors ([4], p. 16¶1-7,)

must sign a conflict of interest form ([4], p. 19¶5), which indirectly obligates them to uphold the IPCC principals and products.

It is undisputed that not only does the IPCC recommend propaganda, it teaches and promotes it.

3. Infusion of Propaganda into Scientific Report Writing

3.1. Background

The climate studies that are addressed are the multiple assessment reports published by the IPCC from 1990 to 2014. All of these reports—all of them—deal with one fundamental position, *i.e.* carbon dioxide from man-made sources causes the earth's temperature to rise via a mechanism called the greenhouse gas effect.

The term "warming" or "global warming" by itself has no meaning since the earth warms up and cools down every day, month, year and century. A Warming Period or Warming Cycle, on the other hand, means sustained (often thousands of years) warming periods normally involving a 10˚C or more rise [8]. A cooling cycle is the other direction, but usually slower [8].

Agencies currently measure surface air temperatures above the land and near-surface ocean temperatures (depth less than 2 meters), and then calculate a global average temperature from thousands of locations, for each month and each year [9]. Absolute temperatures vary from place to place, so the temperature changes (anomalies) are reported at each location. A global average anomaly is then calculated. This anomaly is very rough since vast amounts (90+%) of the earth's surface are not included, *i.e.*, temperatures of the soil and rock (centimeters not meters down), mountains, and oceans below the near surface. Because the temperatures from these areas do not change significantly from year to year, [10], ([11], p. 263: Figure 3.3a,) their exclusion can and does exaggerate the anomaly.

In addition, the computer program (HadCRUT4) that calculates anomalies was changed in 2012 and skews the anomalies even higher [12]. Hence, the calculated rough anomaly is tipped higher than actual.

Many believe that the earth is warming although few know how much. Al Gore's book alarms the reader that the ice caps are melting, the coastal cities will flood, droughts will parch the earth, and people will die. If asked whether a temperature rise of less than one degree centigrade over the last 5 - 10 thousand years would constitute going into a global warming cycle, essentially no one would consider that a problem. Strange as it sounds, that is what the data show. **Figure 1** describes a temperature change (anomaly) of about 0.8˚C [11]. The anomaly zero line was arbitrarily selected as 1880. The arbitrary selection can influence the results. If one selects 1944 as the zero line to start the analysis, then the anomaly would be 0.3˚C—almost a third lower. The "anomaly" terminology is confusing since it does not exist in nature, and few non-experts really know what it means. By using this expression most non-experts see only the slope. When coupled with cataclysmic projections nearly

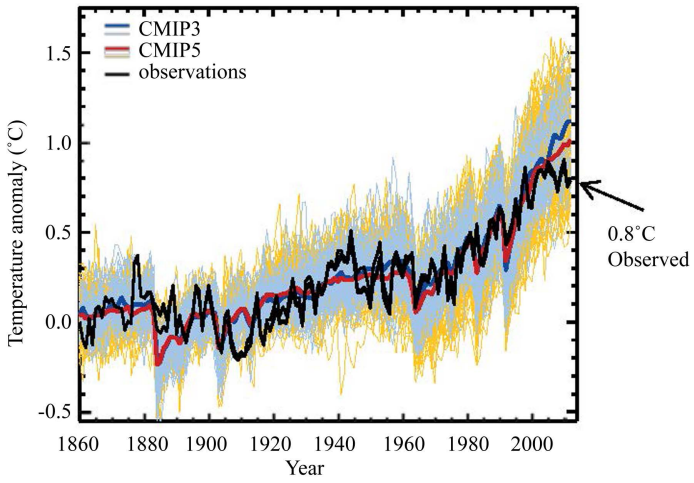

Figure 1. Observational estimates of global mean surface temperature (black lines) from (HadCRUT4), compared to model simulations (CMIP3 models—thin blue lines and CMIP5 models—thin yellow lines) Taken from Figure TS.9a of IPCC 2013 WG1 report at pg. 60 [11].

all believe that all hell's breaking loose.

Figure 1 illustrates a potential "misdirection" by camouflaging actual observation data (black line) with modeling projections set out in thick enveloping colors to trick the eye into seeing an upward trend. The actual data show several upward and downward slopes[1], and illustrate a problem associated with short time periods to predict trends. Useable trends and cycles are established by thousands of years.

3.2. What Is Normal?

The temperature of the earth goes through many solar and natural cycles. Sun spots cycle every ±eleven years, the earth's orbit changes every ~100,000 years, the earth's tilt varies every ~41,000 years [14] and large meteorite impacts occur every 130,000 +years [15], all can affect the earth's temperatures. The earth also goes through its own natural cycles such as tectonic plate movements, massive volcanic eruptions, magnetic fields variations, weakening of atmospheric and oceanic tides, winds and ocean current fluctuations, and changes in the biological inputs. All of these factors have an influence the earth's temperature.

3.3. Archeological Records

Historical records capture temperature fluctuations over geologic time. **Figure 2** reports anomalies over the last 800,000 years [8]. Temperatures are not measured directly but are extrapolated from oxygen isotope ratios from Antarctic ice cores [16]. The figure indicates Antarctic temperature changes and not global temperature anomalies [17]. The Earth began its climb out of the last global cool period about 18 thousands years ago and finished 10˚C warmer about 12 thousand years ago. For the past 5 thousand years, the temperature has been "exceptionally stable" with variations of ±0.5˚ from average. There have never been "back to back" warming events (~10˚ rise [8]) as some are foretelling. The IPCC acknowledges that it takes an increase of at least 1˚C to be considered

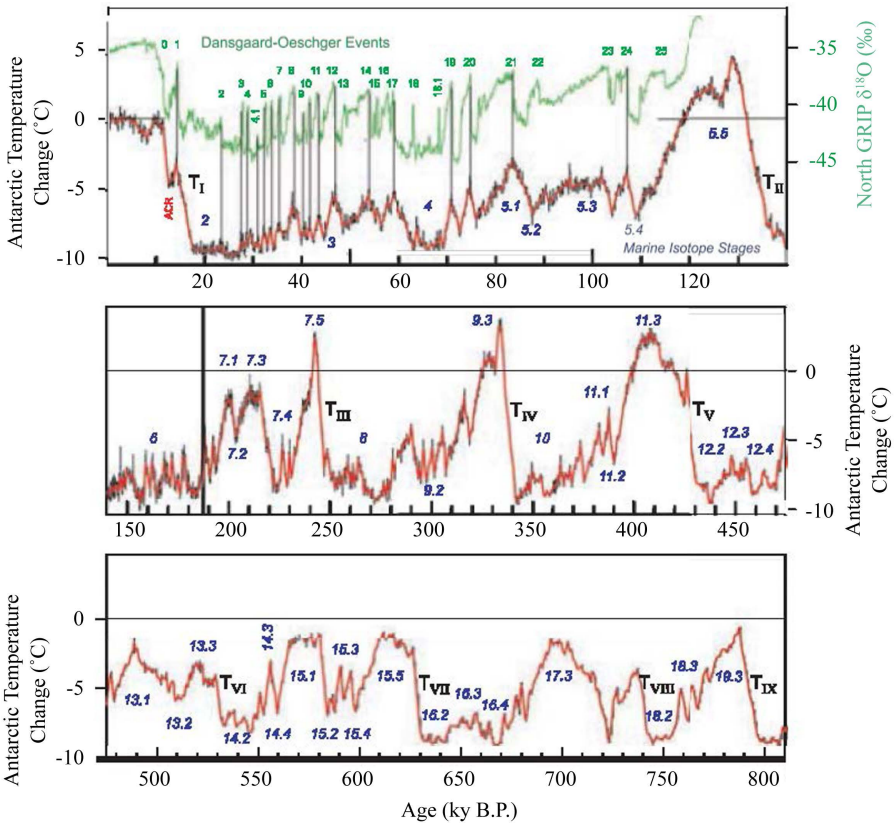

Figure 2. Antarctic Temperature anomaly over last 800,000 years from Jouzel *et al*. [8].

[1]Variations: 1860-1878 upward, 1878-1910 downward, 1910-1945 upward, 1945-1965 downward, 1965-1998 upward, 1998-2013 downward [13].

the start of a signal ([18], p. 253). The earth has not reached that point today and the evidence does not indicate that the earth is in or entering a second "warming cycle".

The fact that earth is very stable today, and that "back to back warming events" have never occurred in the entire geologic history, does not mean that something could not alter that course. Many believe that such event is now occurring based on CO_2 from burning of fossil fuels.

3.4. Carbon Dioxide Concentration

Figure 3 visually displays a dramatic increase in CO_2 levels since 1900 and particularly since 1950. Jumping to a quick conclusion from a figure indicates an emotional response and should be viewed with caution, *i.e.* propaganda triggers emotions.

A closer look shows that the scale in **Figure 3** was expanded 10,000 times over the normal. The actual composition of atmospheric air is 78% N_2, 20.9% O_2, and about 1% water vapor at sea level. This makes up 99.9 percent of the air. Small amounts of argon, hydrogen, helium, make up the difference with CO_2 coming in at a distant 0.04 percent.

Figure 4 is a bar chart of the actual composition of atmospheric air. Water vapor concentration is the green line. The highest concentration of CO_2 is 25 times less and so small that it cannot be seen on the chart.

Historically, the CO_2 concentrations have varied from near zero to over 4500 ppm. That is more than 100 times greater than today. During the Juristic period it varied from near zero to 2000 ppm [19]. Between today and 310 million years ago the CO_2 varied from 100 ppm to over 2200 ppm [20]. Ice cores for the last 160,000

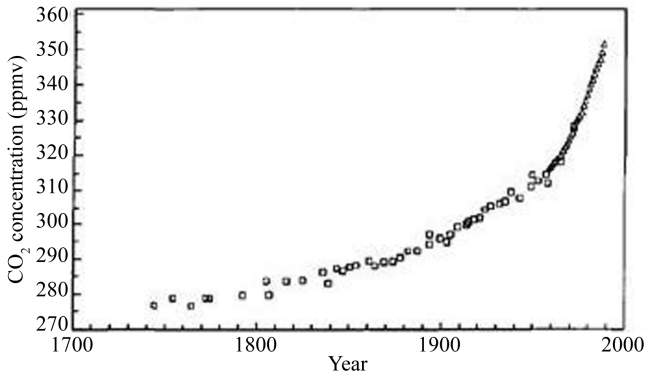

Figure 3. CO_2 concentration versus years. Taken from Figure 1.3 from 1990 IPCC report [18].

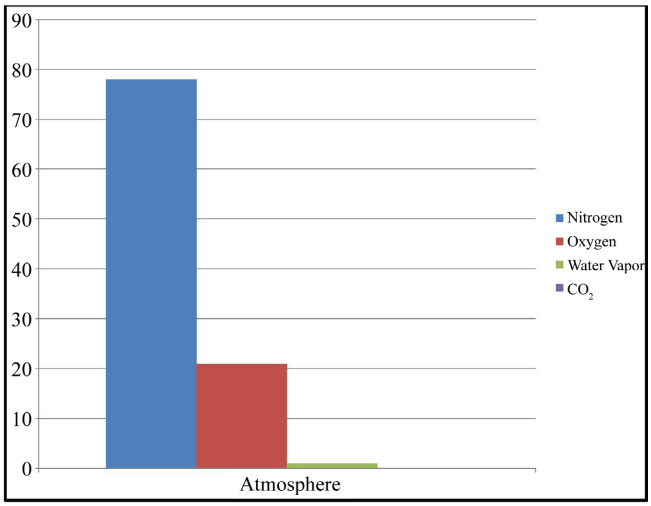

Figure 4. Bar chart of the composition of air from 0 to 100%.

years show CO_2 concentrations varied from 180 to 300 ppm ([18], p. xv).

These records confirm that a concentration of 400 ppm is neither unexpected nor unusual.

4. Surprising Results Emerge From Current and Historical Observation Data

4.1. Greenhouse Effect

The term greenhouse effect is a misnomer since it does not function like a regular greenhouse ([21], p. 28). The greenhouse theory suggests that high energy sunlight passes through atmospheric greenhouse gases unimpeded and warms the earth. The earth emits low energy long-wave radiation known as infrared. This infrared radiation travels up through the atmosphere where it is absorbed by the greenhouse gases increasing the gases kinetic energy (temperature.) There is no question that this process slows global heat loss, *i.e.* a blanket analysis. The greenhouse theory adds a controversial extra step and proposes that the greenhouse gases re-radiate a portion of the infrared radiation back to the earth ([18], p. xiv) and that this is the dominate mechanism for keeping the earth warm.

The greenhouse theory assumes that only radiation heats and cools the earth and that greenhouse gases are why the earth is not −18˚C, or 33˚ cooler than a black body without any atmosphere ([18], pp. xxxv, & xxxvii). The heating and cooling process of the earth is more complicated than a simple greenhouse effect. There are many factors that affect the Earth's temperature and ignoring them creates serious errors. [Suns radiance variations [22] (Milankovitch solar cycles); Gravity; Earth's declining magnetic fields; [23] Earth's nuclear core; [24] earth's natural processes, chemical processes, radioactive decay, biological processes, convective transfers, latent heat, etc.]

To confound the matter, blaming everything on CO_2 as the single most important perpetrator in the greenhouse theory cannot be done. Water vapor has absorption spectra many times larger than carbon dioxide ([18], p. 48), overlaps carbon dioxide absorption spectra at several wavelengths, and is some 25 times more concentrated. [25] Water vapor is by far the most dominating greenhouse gas ([21], p. 205). A CO_2 reduction to the 1800 year values (120 ppm less) would have very little measureable effect over and above water vapor in the lower atmosphere. Some studies go even further and reject a CO_2 connection in favor of an ozone link [26].

Satellite observations report infrared radiance coming from the upper atmosphere with a 15 micron wavelength, [27] which happens to be the major absorption band for CO_2. According to Kirchhoff's third law a thin cool gas in front of a hotter solid emits radiation at its absorption lines. This means that CO_2 is probably a significant source of the 15 micron radiance and may be a factor in cooling the earth. This may also provide an additional explanation why the stratosphere has been cooling during the industrial period ([28], p. 38: Fig. TS.7). However, satellite observations from space only record outgoing radiation, and not what's going on below. For example, watching a person leave his house does not reveal what he did inside.

The earth has an average temperature of about 15˚C, which is considerably warmer ([18], p. xxxvii) than the gas and particles in the stratosphere. The second law of thermodynamics holds that heat travels from a hot source to a cold source, that is, something cold cannot heat up something hot [29]. Hence, radiation at an effective temperature of −80˚C cannot heat up a warmer object, *i.e.* the earth. Although radiation travels in all directions, the net flux is always from hot to cold. This also creates some strange glitches, *i.e.* the temperature of the tropopause is constant even though troposphere below and stratosphere above are both warmer[2]. Radiation in general is an exceedingly complicated process. This is not surprising since there are many unresolved theories as to whether radiation is a wave (Maxwell), a particle (Newton), or both (Bohm) or neither (Eddington) [30]. This uncertainty provides a degree of support for or rejection of almost any theory. Until a clear theory can be established, confirmation must lie primarily with empirical evidence.

4.2. Laboratory Experiments

Laboratory experiments with greenhouse gases have been limited to absorption and re-emission spectra. There has been no laboratory or small scale experiment supporting the greenhouse gas effect. Experiments with enclosed systems, *i.e.* actual greenhouses, are not applicable because the air is trapped and heated by convection. (The sunlight heats the grounds and the air heats by contacting the ground.)

[2]The Tropopause: from below—there are adiabatic processes involved (lower pressure lowers the temperature) plus water vapor freezes out and therefore absorbs less infrared radiation. From above—the ozone gradually heats the upper stratosphere and because there is less water vapor in the tropopause it does not absorb the radiation.

Particles, including droplets, are different from gases. Crops freeze (radiation frost [31]) on clear nights but not on cloudy nights because the clouds (water droplets, ice crystals) reflect/re-radiate infrared radiation back to earth. The Pictet experiment proved that infrared radiation can be reflected [29]. On cloudless nights farmers burned wet rice-straw to recreate clouds, some even added black soot by burning tires, with limited success. It illustrates, however, that a narrow greenhouse type effect likely exists—but associated with particles. Assigning all of the back radiation to gases ([32], p. 58: Figure 1.3) and none to particles is conflicting.

4.3. Observational Studies

An observational study is displayed in **Figure 5** [18] [33] visually suggest CO_2 and temperature anomalies are related. It illustrates that CO_2 levels and anomalies go up and down in roughly the same geological time period. A longer geologic time period [19] [34] [35] reveals a more complete picture showing that there were exceptionally high CO_2 concentrations (over 1000 ppm) during ice ages. If increasing CO_2 levels force a rise in temperature, logic suggests that CO_2 concentrations 3 to 5 times higher than they are today would not support an ice age. It may suggest the opposite, *i.e.* a cooling component to CO_2. There were studies showing very high CO_2 concentrations during cool periods [36]. During the mid-Pliocene period (3.3 - 2.9 Ma) the CO_2 levels were similar to what they are today (350 - 450 ppm) but the sea levels were 21 meters higher. This suggests a decoupling of CO_2 to temperature [37].

Several studies reported that a rise in CO_2 concentration actually lagged behind a temperature rise [38]-[41]. This supports a CO_2—temperature connection, but places temperature as the driver and CO_2 riding shotgun. This is supported by standard chemistry and engineering principles. Carbon dioxide prefers to dissolve in cold water over warm [42]. When the oceans warm, CO_2 bubbles into the atmosphere. With ninety three percent of the total global carbon reserve residing in the ocean and accounting for 57% of the global CO_2 emissions[3],

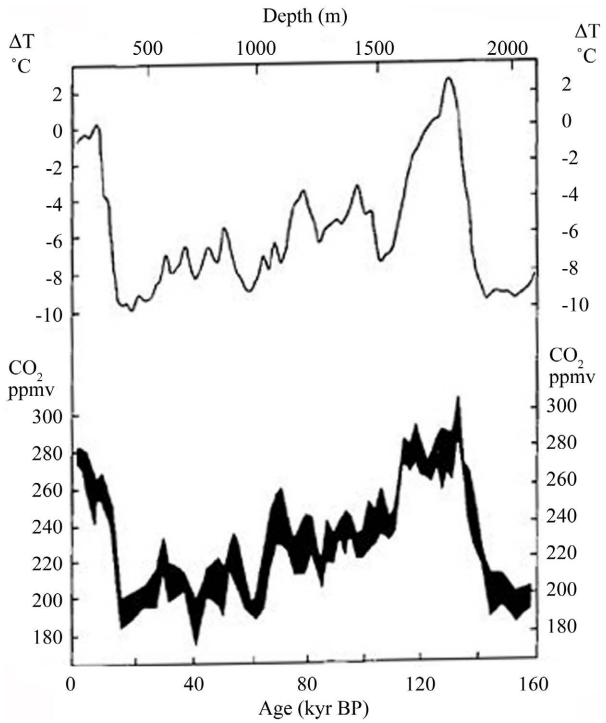

Figure 5. Archeological records. On the vertical axis, temperature anomaly on top and CO_2 concentrations on bottom. The horizontal axis is years in 1000 year increments (kyr). This is from Figure 1.6 pg. 11 of the IPCC (1990) report [18] referencing Barnola *et al*. 1987 [18] [33].

[3]This information contains inaccuracies. The various IPCC reports contain carbon cycle discrepancies unrelated to fossil fuel emissions. The carbon numbers in Figure 1.1 of the 1990 IPCC report [18] do not match those in Figure 2.1of the 1995 IPCC report [32], do not match those in the 2001 IPCC report (pg. 188), do not match those in Figure 7.3 of the 2007 IPCC report [28], and do not match those in Figure 6.1 of the 2013 IPCC report [11].

([32], p. 77: Figure 2.1) science easily supports that temperature is a licensed driver.

The IPCC's vice chairman, along with others, performed a study of one warming cycle (Term III), [43] and confirmed a lagging CO_2, but only in the Southern Hemisphere. No conflicts there. Oceans absorb the largest portion of the earth's thermal radiation, and the Southern Hemisphere accounts for 60 percent of the total ocean surface. Logic supports a leading Southern Hemisphere warming.

4.3.1. Current Observations

Current observations over last 100 years are the most accurate as they are actual measurements and not proxies. **Figure 1** indicates that the global temperature anomaly rose from ~0.1˚ in 1900 to ~0.8˚ in 2014. **Figure 3** for the same time period reported that CO_2 increased from 295 to 400 (extended to 2013 by Fig. SPM. 4a pg. 12) [11]. Superimposing one onto the other may be inappropriate for many reasons, including the fact that the lag time between a rise in CO_2 and its alleged effect on the global temperature may be greater than the period observed. The IPCC acknowledged ([18], pp. 5, 17) a 50 to 200 year lag. Others report a much longer lag time, [39] making future projections based on the current observations premature.

Figure 6 is a diagram from Scripps CO_2 Program plotting precise carbon dioxide measurements from 1960 to 2014 at various locations (latitudes) [44]. The concentration similarity at both poles infers good yearly mixing.

4.3.2. Polar CO_2 Concentrations

Carbon dioxide concentrations are slightly higher at the North Pole than the South Pole and slowly increasing. In 1972 the difference between the poles was 4.1 ppm and in 2014 the difference rose to 5.4 ppm. This suggests an influence from other CO_2 sources in the north. Since the Northern Hemisphere accounts for 95% of the fossil fuel emissions ([18], p. 10), it is a viable candidate for this increase. But it does something else. It suggests that fossil fuels play a very minor role, *i.e.* a small fraction of the total (5.4 ppm and not 400 ppm.)

Blaming the entire increase[4] (120 ppm) on fossil fuels is inconsistent with fundamental engineering principles. The oceans and biomass do not pick and choose which CO_2 molecules to absorb, and there has always been a major portion of CO_2 in the atmosphere unrelated to fossil fuels. The oceans and plants absorb almost all ([32], p. 77: Figure 2.1.) (96.7%) of the emissions. Applying this absorption to the cumulative increase (120 ppm,) yields 4 ppm of uncaptured fossil fuel emissions. This is remarkably close to the total of 5.4 ppm as discussed above. An independent verification provides validation. The increase from 4.1 ppm to 5.4 ppm over 42 years (0.31 ppm/decade) is within the range reported by Korr [45] when El Nino events (ENSO) and the Volcanic Aerosol Index (VAI) are removed, *i.e.* between 0.7 and 0.2 ppm/decade. The remainder of the CO_2 increase (114.6 ppm) is easily explained from the slight ocean temperature rise.

4.3.3. Polar CO_2 Fluctuations

Polar Fluctuations of up to 16 ppm (2014) were observed at the North Pole with principally flat lines registering below the equator. This simultaneously corroborates an ocean source while negating a meaningful fossil fuel link. The Southern Oceans account for 60% of the total ocean surface, and the area around Antarctica accounts for 40 percent [46] of the earth's CO_2 absorption. Somewhere between the South Pole (S 90˚) and the equator is a medium point where the majority of the CO_2 is released. The wind circulation in the Southern Hemisphere spreads the CO_2 around the world in a few weeks, [47] consistent with the flat fluctuations below the equator. Many reasons exist why it takes a longer period to cross the equator and mix with the CO_2 in the Northern Hemisphere. This theory is consistent with increasing fluctuations the further away from the medium point, *i.e.* below the equator. If fossil fuel burning was the reason for the high fluctuations, then the greatest oscillation would be seen at the longitudes between 30˚N and 50˚N where the majority of the fossil fuels are burned. But it is not. The greatest fluctuation is at the North Pole and furthest from the Southern Oceans confirming an ocean source. Although land biomass respiration may have some effect there are too many unknowns [48].

4.3.4. Declining $^{13}C/^{12}C$ Isotope Ratio

A declining isotope ratio in the atmospheric CO_2 has been urged as proof that fossil fuels is the culprit ([18], p. 14) ([32], p. 81). This position is based on plants preferring the lighter carbon isotope (^{12}C) in carbon dioxide; and those fossil fuels come from plants. Burning these fuels ([18], p. 14) increases the amount of ^{12}C in the air

[4]The increase from fossil fuel use from 1900 (280 ppm) to 2014 (400 ppm) is 120 ppm.

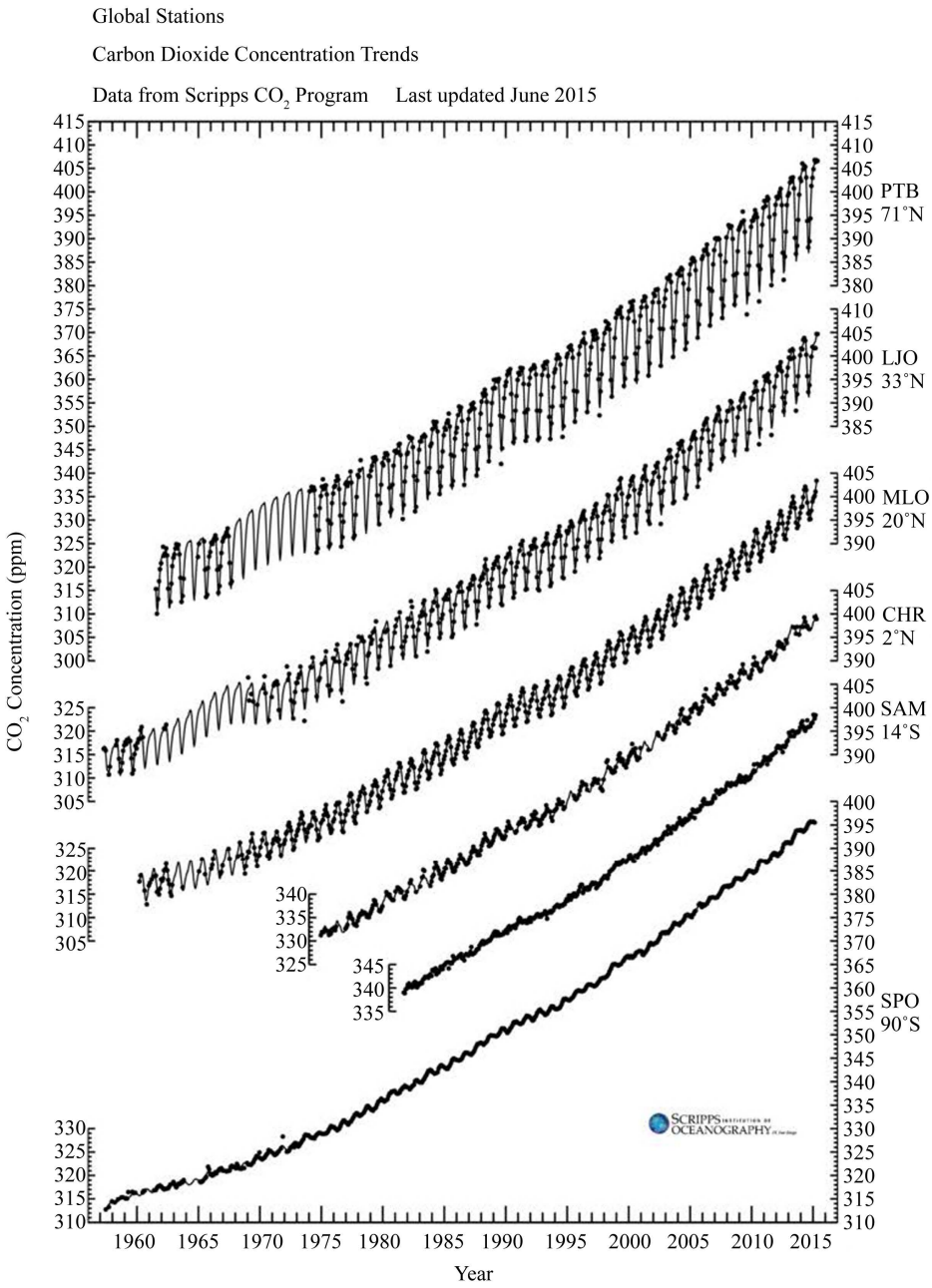

Figure 6. A plot of CO_2 concentrations on the vertical access at various locations from 1960 to 2015. It is taken from the Scripps CO_2 Data [44].

and hence causes a decrease in the isotope ratio. Finding one potential suspect does not end the investigation. Historical records [49] show that the ^{13}C isotope level rises and falls frequently long before fossil fuel burning was occurring without any discernable relationship with CO_2 concentrations. Connecting the recent decline in the isotope ratio to fossil fuels, indicate a hurried conviction. There are other potential suspects. Ocean phytoplankton (plants) may be diminishing in large quantities (up to 40%) since 1950 [50] [51]. A reduction in ocean phytoplankton respiration lowers the amount of ^{12}C "removed" thereby decreasing the isotope ratio while simultaneously increasing the CO_2 concentration. This phytoplankton connection has not been scientifically investigated, and may be connected to ozone depletion [52]. The only thing that can be said about currently declining carbon isotope ratios is that its connection to fossil fuels is uncertain at best.

The current observations support the position that temperature likely controls CO_2 emissions from the ocean and that burning fossil fuels probably has little to no effect, *i.e.* about 5.4 ppm out of the total of 400 ppm.

5. Acidification of Oceans

The IPCC's position is that the increasing CO_2 concentration leads to increasing acidification of the ocean ([28], pp. 14, 77, 529, 750, 793). When CO_2 dissolves in water the vast majority [53] stays in a gas state. The remaining smaller portion disassociates and creates short-lived carbonic acid which can affect pH. The pH is the measure of the hydrogen ion concentration and measures both acids and bases (alkaline). The oceans are alkaline (basic) and will always be alkaline because of the immense total alkalinity. Alkalinity is water's ability to neutralize acids and includes vast amounts of ocean minerals (limestone, marble, shells, etc.) that reacts/absorbs hydrogen ions.

5.1. Ocean Surface Measurements

Selecting the location of measurements creates a potential for confusion, *i.e.* misdirection. All of the pH measurements were done near the air-water interface, *i.e.* the top several centimeters, and not in the deeper zones comprising 99.99+ percent of the ocean. There is direct CO_2 contact at the surface and a measurement at this location would expect to have a higher response. As such, surface measurements are seriously constrained and should not be extrapolated to the entire ocean without a substantial impartial investigation.

5.2. Basic Chemistry Problems

Misunderstandings about basic chemistry create serious drawbacks. The IPCC 2013 report [11] at page 297 states that only 1% of the CO_2 remains as a dissolved gas, the other 99 % disassociates and forms bicarbonate and carbonate ions. Support for this position was an article [54] co-written by two lead authors of the IPCC reports. [55] That article did not present any investigation, tests, or analysis supporting the 1% CO_2(aq) position. It is believed that they reported it incorrectly or were confused. The hydration constant for sea water—Kh *i.e.* $[H_2CO_3]/[CO_2]$ is 1.2×10^{-3}. [53] This shows that almost all of the CO_2 remains as CO_2(aq) and not as carbonic acid. A detailed study of this issue was done [56] and showed by actual tests that the carbonate solution was dominated by CO_2 gas. Confusion over potential verses actual may have occurred, *i.e.* there is a major difference between the potential of CO_2 to form carbonic acid and the amount that actually formed carbonic acid. Only the latter produces hydrogen ions and depresses the pH while the former merely stands ready. An analogy would be the difference between a large number of registered voters (potential) and those who in fact voted (actual.)

In addition, the IPCC report [11] shows in Figure 3.18 at pg. 294 that the H_2CO_3 dissociates entirely to carbonate ions as opposed to bicarbonate ions. This has the effect of doubling the amount of hydrogen ions, *i.e.* pH. The disassociation constants do not support the formation of plentiful carbonate ions, but rather show that it should be at least 1000 times less than bicarbonate ions [53] [57]. These two mistakes result in an overstating of the effect of the CO_2 in reducing ocean pH.

5.3. Improper Comparisons and Scale Manipulation

Figure 7 is from the IPCC 2013 report [11]. On the right hand side of the chart is a plot of the ocean pH visually displaying nearly the same slope as the CO_2 except one positive and one negative. That diagram implies the two are inversely related. The scale for the pH is not the same relative scale as for the CO_2. The CO_2 plot shows a 12 percent rise. In order to show the same linear scale of pH for a slope of 12%, it would have to go from a pH of 8.4 to 7.5. Because the pH only went from 8.12 to 8.08, that is a slope of less than 1 percent (0.49 percent.) To make the plots look related, the pH scale was expanded so that they each visually appeared similar. If the same relative scale were used it would reveal that they are not related. Another complication is that the chart incorrectly compares a linear CO_2 progression to a logarithmic pH regression. Logarithmic functions are exponential and not linear.

5.4. Actual Observations

Observations appear to negate CO_2 as the cause of ocean pH changes. The IPCC presents a color chart illustrat-

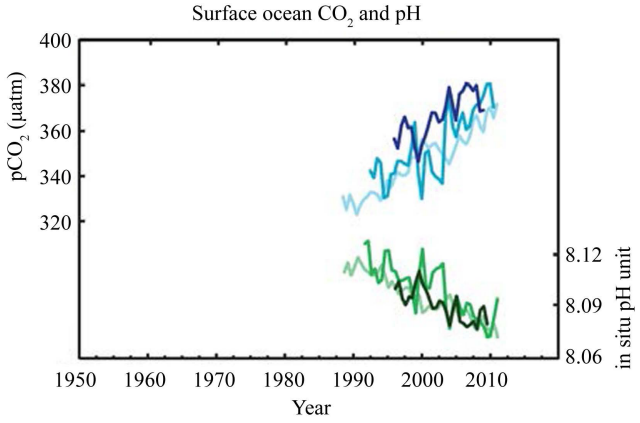

Figure 7. Partial CO_2 pressure and pH at three locations from 1990 to 210, from figure SPM.4 at pg. 12 of IPCC 2013 report [11].

ing where the lowest pH is located ([11], p. 295: Box 3.2, Figure 1 bottom). It reveals that pH is lowest in the warm parts of the ocean and the highest in the colder waters. As discussed earlier, cold water (0˚C) holds almost twice as much CO_2 as warm water (23˚C.) Therefore, the lowest pH should be seen in the colder water and the highest in the warmer waters. Yet, the actual observations reveal the opposite, *i.e.* a higher pH in cooler regions and a lower pH in warmer sections, and particularly in the areas known as the ring of fire. Volcanoes put out enormous amount of water soluble SO_2, and SO_2 forms sulfuric acid. Sulfuric acid (pH 0.3) is 678 times stronger and more stable than carbonic acid. It is likely that SO_2 and other acid gases are affecting the pH. This is supported by the fact that there are 21 times more sulfate ions in surface sea water than carbonate and bicarbonate ions combined [58].

The evidence is overwhelming that CO_2 is not the cause of any measurable pH change in ocean. Whether it affects the top several centimeters (inches) is likely.

6. Sea Level Changes

Data collection on sea levels is vitally important for local and regional planning. The IPCC asserts that the global average sea level is rising as a result of the CO_2 caused global warming, and that the sea level has risen approximately 200 mm since 1880 ([11], p. 287: Figure 3.13a). Is this significant?

Figure 8 is a graph [59] showing the sea level measurements for the last 20 thousand years. It reveals that for the last 7 thousand years the sea level has been exceptionally stable with normal variations, *i.e.* ±1 meter.

The IPCC ([18], p. 264: Figure 9.2) suggests an entirely different situation. It is a narrow 105 year time period (1880-1985) with the sea level scale expanded 100 times. It reports that the sea level rose about 10 - 14 centimeters during that period. This small 0.14 meter rise is well within the normal variations over the last 5 thousand years.

The two biggest factors in sea level rise are tectonic plate movement and glacial ice changes [60]. Ignoring tectonic plate movement can insert a significant error. For example, according to NOAA the sea level in Alaska has gone down (not up) approximately 1 meter (not millimeters) between 1950 and 2012 [61].

Many factors must be considered when analyzing minute changes, including many natural variations. For example, the salinity of the Pacific is less than for the Atlantic, which causes the Atlantic to be 200 mm higher; and the mantle is expanding horizontally at the rate of 10 mm/yr [62]. There have been differences in the geomagnetic field strength (0.38 to 0.3 gauss) in the last 50 years [63] causing changes to the Pacific sea level pressure from 1007 hPa to 1012 hPa. Other factors include glacial melt rebound, changes in wind forces, changes in sea currents, gravitational deviations in the earth with location and time, elliptical patterns of the moon and the earth, etc. Sea levels are exceedingly complex; and an effort to limit them to a singular cause that is somehow connected to CO_2 is overly simplified.

Sea Level plots from the IPCC 2013 report ([11], p. 287: Figure 3.13) show that the sea level rise between 1880 and 2010 (130 years) to be 160 - 200 mm (0.2 m) *i.e.* within normal variations. It also shows that the slope has been relatively constant. This disputes any connection to current increasing CO_2 levels from fossil fuel burn-

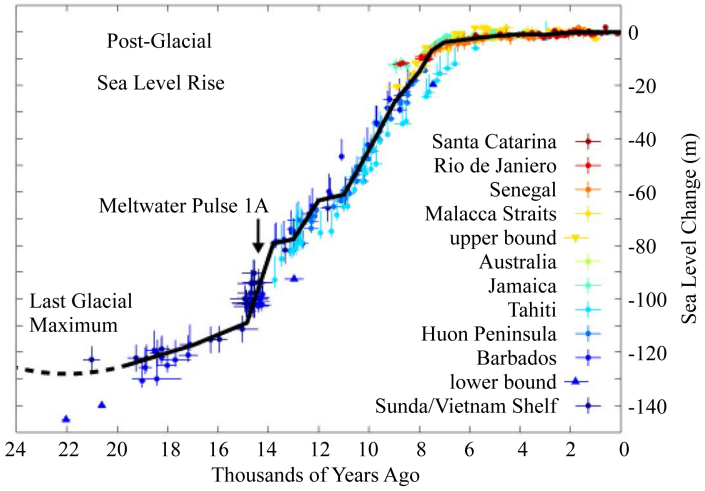

Figure 8. Post glacial sea level rise in meters over 20 thousand years from Global Warming Art by Robert Rohde [59].

ing. It further illustrates why comparisons over a short time period are unreliable. As discussed earlier, there are major lag times and natural and solar variations that must be taken into account.

The data is clear that the earth is in an exceptionally stable period relative to sea levels, and there is insufficient credible evidence that it is going to change significantly in the next thousand years.

7. Are the Ice Caps Melting?

The polar ice caps have been melting for the last 20 thousand years with the rate dramatically stable for the last 5 thousand years [64]. The Antarctic ice volume is about 4700 meters thick, [65] and the Greenland ice sheet is about 2000 to 3000 meters thick. The total ice volume loss is approximately 14 meters in the last 50 years. Between 1980 and 2005 the sea ice in the northern hemisphere has decreased volume while the ice in the southern hemisphere has gained [66]. The amount of net volume loss is difficult to determine. It is believed to be between 0.03 percent to 0.1 percent net losses per year. This is an extremely low amount and consistent with **Figure 8**. The ice extent in the Arctic has gone up and down [67]. The ice extent went down from 11 million km^2 in 2003 to 3.9 million km2 in 2009. It has gone up (gained ice) between 2009 and 2013 to 9 million km^2, and increased 31% in 2014 from the previous year [68]. The ice cover in the great lakes in 2014 was the highest in more than 30 years and 40% higher than normal [69].

The ice melt is not entirely due to air and surface ocean temperature changes. When the Antarctic ice was increasing, there was an unexpected decrease in West Antarctic [70]. It was discovered that a large geothermal heat flux was coming from the ground under the West Antarctic Ice Sheet that could account for that decrease [71]. The Greenland Ice Sheet was discovered to have several dark regions of black dust that increased surface melt [72]. These are the two largest ice volumes on the earth, and illustrates that there are many complex factors that go into changes in global ice mass. Picking one related to CO_2 and identifying that as the cause is unreliable.

The ice mass/volume should continue its slow descent, and hopefully it does. If it turns and goes significantly positive for more than 1000 years could signal the start of a cooling period as the archeological records predict.

8. Point of View Constrains Objectivity

The IPCC specifically limited its study to proving that climate change was the result of man's activities and specifically carbon dioxide, ([18], p. v) as defined in Scope 29 [73]. They started the investigation with certainty that emissions from man-made greenhouse gases were causing global warming and carbon dioxide was responsible for more than half of the greenhouse effect ([18], p. xi). The climate change that "we" (IPCC) "are addressing" is the "result of human activities." ([18], p. xxxvi). Changes in the atmospheric composition are largely due to "human activities." ([18], p. 7). The major contributor to radiative forcing is carbon dioxide since the

industrial times ([18], p. 45). The IPCC created a mathematical formula known as the Global Warming Potential (QWP) that is limited to variations in the concentration of greenhouse gases, particularly carbon dioxide, over time without any other factors ([18], p. 58). A meteorite striking the earth, a super massive volcanic eruption, etc. would have no effect on the GWP unless it happened to change the CO_2 concentration. The Business-as-Usual Scenario assumed that ALL tropical forests have been destroyed (Appendix 1) [18]. It is apparent that the IPCC severely limited its investigation to man-made CO_2 related global warming issues.

Restricting the study to essentially proving one issue, creates an advocacy situation and not a scientific one. The IPCC's "primary audience" was identified as "governments and policy makers." ([3], p. 32). The target audience was not the scientific community, but politicians. This, coupled with the adoption and execution of robust propaganda techniques, support a goal oriented investigation.

9. Climate Model Too Simplistic

The current climate models are based on overly simplistic two dimensional analyses because three dimensional real world models with infinite material variables are impossible to solve. Excluding the natural and solar forces that are not connected to CO_2 is not appropriate. Adopting arithmetic averages for complex variables (albedo, temperature variations, concentration variations, heat flux, radiation, etc.) is a large source of errors. For example, the average wind velocity across a hurricane is essentially zero since one side cancels out the other. As an analogy, it is unlikely that a single person would base his/her opinion as to the value of their home grounded on a world average sales price no matter how sophisticated the mathematical model. Applying arithmetic averages to predict changes in complex natural phenomena that vary exponentially (e.g. radiation varies with the 4^{th} power) is too simplistic.

10. Conclusions

Propaganda was adopted and used extensively by the IPCC in accordance with its own written manifesto. Changing the scale to imply a relationship is a classic misdirection and was practiced time and time again (CO_2-Temperature, CO_2-pH, CO_2-Sea level, CO_2-Ice volume, etc.) Restricting the scientific investigation to proving a connection to CO_2 and admitting that its target audiences were politicians suggests a biased agenda. Proclamations of cataclysmic consequences are propaganda and not based on scientific facts. The data are insufficient to validate a current global warming trend or to support that minute increases in CO_2 concentrations can cause global cataclysmic consequences. There is significant credible evidence that the CO_2 increase is from small fluctuations in the ocean temperature, and that fossil fuel accounts for about 1 percent of the total. The ocean pH is not related to CO_2; sea levels are exceptionally stable and within normal fluctuations; and ice volumes will continue to be secure for the next thousand years.

The mere fact that earth quakes, tornadoes, or hurricanes (size, location and date) just a few months away cannot be predicted, even though the mathematics for a regional event is far simpler and more detailed data are available, should raise a red flag on predictions of global events, which are infinitely more complex.

The fact is—**the earth is boringly healthy**.

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