Response to comments by Mr. Gareth Renowden on "Hypothetical global warming: skepticism needed"

By Bryan Leyland & Bob Carter

Introduction

Thank you for the opportunity to comment on the blog-posting by Gareth Renowden (*25 ways the DomPost failed its readers …*, 06/03,) which the Science Media Centre subsequently reproduced on its website.

Mr. Renowden's remarks were made in relation to a newpaper opinion piece of ours published last week (*Hypothetical global warming: scepticism needed*, 05/03, Dominion Post).

Subsequently, Mr. Renowden contributed a second article (DomPost denier debacle: science has the last word, 10/03,) regarding a later Dominion Post article, *Human role in climate change is clear*, by the three IPCC-related authors Drs. Wratt, Reisinger & Renwick (WRR). Our rebuttals of the Wratt et al. article are available here and here.

When we read through the "25 ways to be wrong about climate" posting, we found that Mr. Renowden (and WRR) are in agreement with us regarding many of the facts contained in our original article. We differ on the interpretations.

Mr. Renowden and WRR all appear to fail to understand that the scientific process is one of hypothesis testing. In the context of the articles under discussion, the relevant hypothesis is that of Dangerous Anthropogenic Global Warming (DAGW), usually formulated as:

> *Dangerous global warming is being, or will be, caused by human-related emissions of greenhouse gases – especially carbon dioxide.*

As we show below, these authors do not explicitly test, or even address, this key hypothesis. Instead they simply assume that it is true.

A fully referenced version of our original Dominion Post article can be found here. For brevity, we comment here on only a subset of the 25 points raised by Mr. Renowden (some of which have been raised by WRR as well), these being the points that in our eyes have some scientific significance.

Enumerated discussion points

The paragraph numbers below, which are in ascending order but not always contiguous, refer to the equivalent numbered paragraphs in Mr. Renowden's original posting. At the start of each such paragraph, Mr. Renowden chose an extract from our original article to quote, followed by his own critical comments. Thus the italicized statements that immediately follow each paragraph number below represent quotations from our Dominion Post article as selected by Mr. Renowden. Our commentary then follows in ordinary type.

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2. *"These predictions* (of future temperature rise) *are largely based on the output of computer models, rather than observations of what is happening in the real world".*

Mr. Renowden asserts that, instead of model projections, palaeoclimatological evidence is the dominant reason for believing in future DAGW.

Such evidence is indeed important. For instance it shows:

- That modern planetary temperature is not unusually warm; there is convincing evidence that the Mediaeval Warm Period, Roman Warm Period and Holocene Climatic Optimum, were warmer than the present.

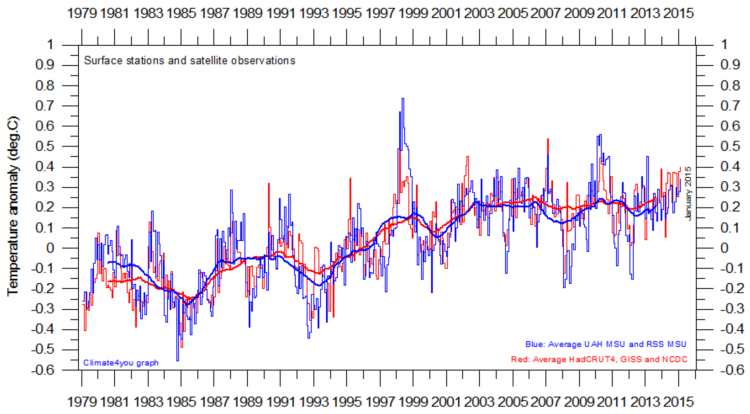
- That all the major temperature variations observed since thermometer records began in about-1850 can be matched, or are exceeded, in both rate and magnitude by similar natural variations in palaeoclimatological records.

- That at the scale of climatic cycling preserved in polar ice cores, changes in atmospheric carbon dioxide follow the changes in temperature by periods of a few hunDr.ed to a thousand years or so.

In essence, then, the palaeoclimatological data show (i) there is nothing unusually warm about present day temperatures; and (ii) in the past changes in temperature during climate cycling occurred BEFORE changes in carbon dioxide – thus vitiating carbon dioxide as the cause of the warmings.

3. *"The world has not experienced any significant warming over the last 18 years".*

Mr. Renowden disputes this generally accepted fact with the comment that there has been "*no reduction in the amount of heat accumulating in the system – mainly in the oceans*".



Plot showing the average of monthly global surface air temperature estimates (HadCRUT4, GISS and NCDC) and satellite-based temperature estimates (RSS MSU and UAH MSU). The thin lines indicate the monthly value, while the thick lines represent the simple running 37 month average, nearly corresponding to a running 3 yr average. As the base period differs for the different temperature estimates, they have all been normalised by comparing to the average value of 30 years from January 1979 to December 2008. Last month included in analysis: January 2015. Last diagram update: 3 March 2015.

We provide a diagram (above, after Dr. Ole Humlum, *climate4you)* of the five established global temperature records that establishes the lack of atmospheric warming.

Readers should also note that DAGW has always been presented as an issue related to atmospheric temperatures, and has never been about what may or may not be happening in the ocean. Besides, should heat have disappeared into the ocean, as Mr. Renowden asserts, then that would be consistent with the 1979-1997 period of rising temperatures having been caused by heat coming out of the ocean, not by human-related carbon dioxide emissions.

But anyway, heat is not accruing in the oceans, which cooled between1992 and 2011 (Liang et al., 2015).

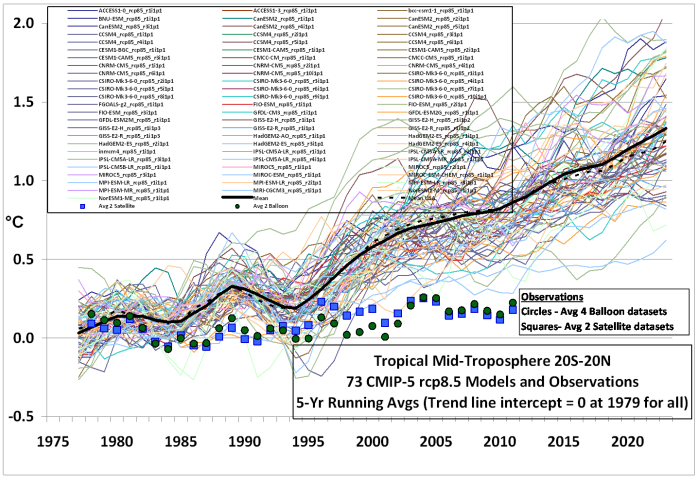
4. "… *more accurate satellite records..."*.

In criticizing our assertion that satellite temperature measurements are superior to ground-based thermometer measurements, Mr. Renowden claims that "*The satellite record is interesting and useful, but cannot stand in or substitute for real temperature measurements taken at the earth's surface*".

The close similarity of temperature changes measured by satellite and surface thermometers over the last 35 years (figure in point 3, above) confirms that there is little difference between the records. The satellite records are, however, superior in that they represent a systematic and unbiased set of measurements collected from over almost the whole globe.

5. *Models … "failed to predict this lack of warming"*.

Mr. Renowden comments: "*Wrong. There has been no lack of warming*".



We provide a summary graph (above; after Dr. Roy Spencer) of 73 climate model projections compared with measured temperatures that establishes the factual accuracy of our original statement.

Second, and as summarized on Judith Curry's blog, the IPCC's 5AR states that 111 out of 114 their climate model runs failed to reproduce the actual temperature record (IPCC AR5 Chapter 9, Box 9.3.2).

And, third, the reference cited by Mr. Renowden in support of his argument states that "*Global mean surface warming over the past 15 years or so has been less than in earlier decades and than simulated by most climate models*."

6. *" We can now be confident that man-made carbon dioxide does not cause dangerous global warming and that the predictions of computer models of the climate are worthless*."

In contradiction, Mr. Renowden asserts that "the vast majority – 97% or thereabouts … of scientists with genuine expertise in this field" would beg to differ with our statement.

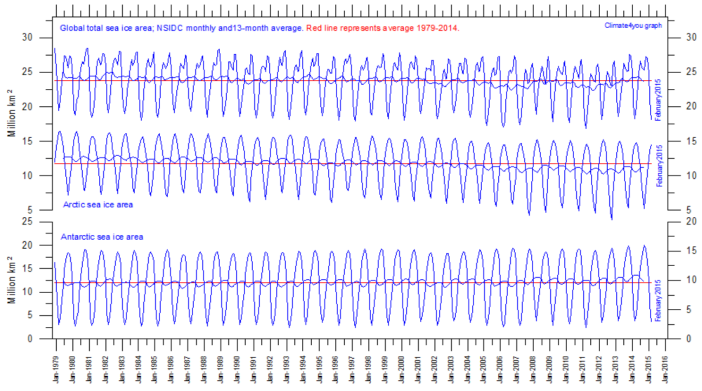
It is alleged that 97% of climate scientists agree that man-made carbon dioxide could cause some global warming. Given that carbon dioxide is a greenhouse gas, this is scarcely surprising, and we would agree. But, anyway, science is not concerned with this or any other consensus. Rather, science deals with evidence, repeatability and hypothesis testing.

If, indeed, carbon dioxide does cause significant warming, then some powerful and unknown natural phenomenon must have been at work to suppress the predicted warming over the last 18 years. The much simpler explanation is that the models overestimate warming, and the latest IPCC report speculates that this is indeed the case. "This difference between simulated and observed trends could be caused by some combination of (a) internal climate variability, (b) missing or incorrect radiative forcing, and (c) model response error" (Reference Box 9.3.2; point 5 above).

7, 8, 9 & 10. *Sea ice extent.*

Mr. Renowden asserts that some of the figures we cited for sea-ice area, in both the Arctic and the Antarctic, were wrong. The attached chart, from Dr. Ole Humlum's *climate4you* site, shows the total sea ice area since 1979. It is obvious that there has been no dramatic change.

Note: September 2012 the Arctic sea ice reached an absolute minimum extension since start of observations in 1979. September 2013 the Antarctic sea ice reached an absolute maximum extension since start of observations in 1979.

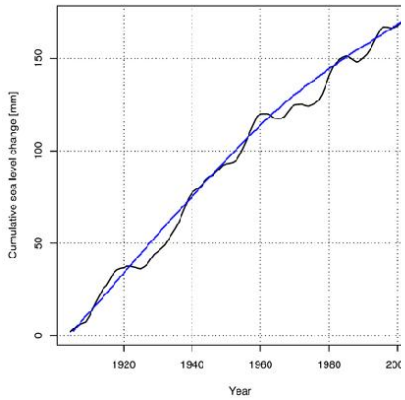


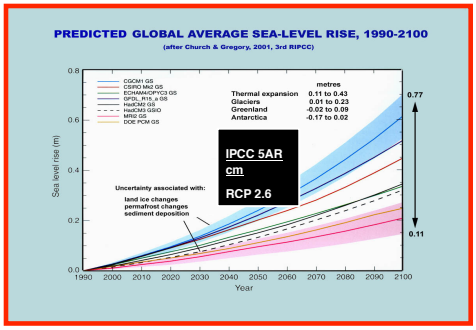
Graphs showing monthly Antarctic, Arctic and global sea ice extent since November 1978. The area covered by sea ice is defined as having at least 15% sea ice cover. Thin blue lines show monthly values, and thick blue lines show the simple running 13 month average. The red lines show the 1979-2014 average. Data kindly provided by the National Snow and Ice Data Center (NSIDC). Last month shown: February 2015. Latest figure update: 3 March 2015.

Mr. Renowden also points out that models have consistently underestimated ice decline in the Arctic. He fails to mention that they also consistently underestimated the ice *increase* in the Antarctic. Clearly, current generation models are incapable of making accurate projections of future sea-ice area.

11. "… *rate of sea level rise has slowed …"*

In contradiction, Mr. Renowden asserts that "*the rate of sea level rise has accelerated in recent decades*".





A chart of the rate of sea-level rise during the 20th century (above; after Holgate, 2007) shows that the cumulative increase in mean global sea level (1904-2003), derived from nine high quality tide gauge records from around the world, has been decreasing.

The average rate of sea-level rise around the world as recorded by tide gauges is less than 2 mm/yr (20 cm/century) (de Lange & Carter, 2014). IPCC estimates, based upon unvalidated computer modelling, have varied widely since their first assessment report in 1990. But in their 5th and latest report, and even for their least extreme emissions scenario (RCP 2.6), their low-end estimate is for at least 26 cm of rise by 2100 (figure above).

Again, the measured facts contradict the speculative computer models.

12. *"… polar bears …"*

Mr. Renowden comments that, contrary to our statement that polar bears are in good shape, they are "*still listed as endangered* …".

Endangerment listing is a political and not a scientific process.

The reference that we cited says:

> "*The US Fish and Wildlife Service estimates that the polar bear population is currently at 20,000 to 25,000 bears, up from as low as 5000 to 10,000 bears in the 1950s and 1960s,* and, after the United States Geological Survey, that "*polar bear populations may now be close to historic highs*".

Second, in a recent report (Crockford, 2015) a leading polar bear researcher concluded that:

> **"***On almost every measure, things are looking good for polar bears. Scientists are finding that they are well distributed throughout their range and adapting well to changes in sea ice. Health indicators are good and they are benefiting from abundant prey. It really is time for the doom and gloom about polar bears to stop.***"**

13. *"Coral atolls are not disappearing beneath rising oceans".*

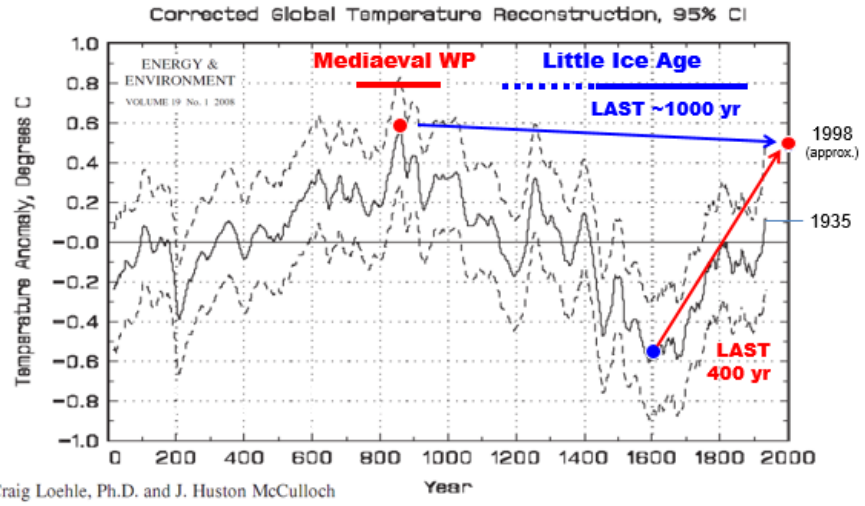
After agreeing with the statement, Mr. Renowden comments that living conditions for human inhabitants of coral islands "*are becoming difficult, and will become impossible later in this century*".

These statements are broadly true, but no evidence exists for the implication that the deterioration in living conditions is due to carbon dioxide-forced sea-level change. Instead, environmental degradation on coral islands is caused by the vagaries of natural processes (such as storms and spring tides) and by pressures imposed by a growing population (such as water table depletion).

It should be noted, however, that these problems will arise only if sea-level rise occurs at model-projected rates; there is no reason to assume that will in fact occur.

17. "*Historical records show that the world was warmer during the Middle Ages Warm Period*".

Mr. Renowden disputes that the MWP was either (i) warmer than today; or (ii) global in extent, as do many other blog writers.



The diagram above (after Loehle & McCullough, 2008; and see further discussion here), based on palaeotemperature proxies from throughout the world, shows that Mr. Renowden is wrong on both counts.

Further evidence of both the warmth and global extent of the MWP is contained in the paper by Soon & Baliunas (2003) and the database compiled by Craig Idso, Medieval Warm Period Project.

18. "*Ocean acidification … the ocean is alkaline and is at no more risk of becoming acidic …"*

Mr. Renowden states baldly his opinion that "The effect [of increasing atmospheric carbon dioxide] on oceanic ecosystems will be huge*"* but offers no evidence; nor is there any.

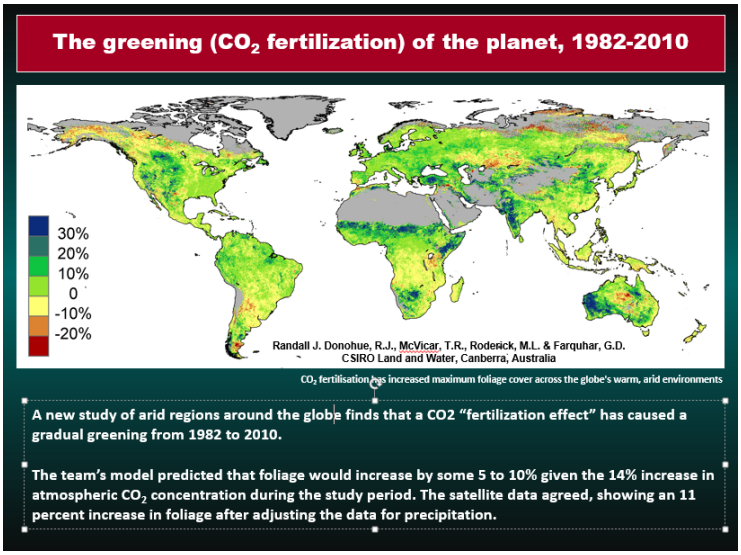
The question of the changing alkalinity of the ocean is fully discussed in the NIPCC (2014) report, *Climate Change Reconsidered: Biological Impacts*, Chapter 6, Aquatic Life.

19. "*Increased levels of carbon dioxide have boosted plant growth worldwide …"*

Mr. Renowden indicates agreement with our statement by commenting that increasing carbon dioxide will benefit some, though not all, plants. He then adds: "*Any benefits will be offset by increasing droughts, floods and heatwaves and rapid polewards migration and distortion of ecosystems."*

The diagram below, from Donahue et al. (2013), shows that an 11% increase in plant productivity worldwide was associated with a 14% increase in atmospheric carbon dioxide between 1982 and 2010.

In addition, the compendium of Idso & Idso (2011) and Chapters 1-4 in the NIPCC (2014) report, *Climate Change Reconsidered: Biological Impacts*, provide a detailed documentation of the variety and extent of plant response to carbon dioxide fertilization.



20. *"IPCC shows the frequency of floods has hardly changed"*

Mr. Renowden again disagrees with a statement of fact (IPCC AR5, WGI, Chapter 2 on extreme events), and again calls on unspecified "studies that show ..." in support of his contrarian beliefs.

Specifically, in 2014 the IPCC asserted that "… *There continues to be a lack of evidence… regarding the sign of the trend in the magnitude and frequency of floods…* ". This statement is based on information contained in the *Special Report on Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation* (IPCC, 2013).

The matter is also extensively discussed, with a similar conclusion, by the NIPCC 2013 report *Climate Change Reconsidered II: Physical Science*, Chapter 7, Extreme weather.

22. *"Scientists who study natural climate cycles and the effect of the sun spot cycles… believe that the world has – or soon will – enter a cooling cycle."*

That many experienced solar scientists believe that solar variations (including ultraviolet and magnetic field variations) may exert a significant influence on terrestrial climate, including both warming and cooling influences, is attested to by such recent papers as Abdusamatov (2012), Penn & Livingston (2011), Scafetta & Wilson (2014), Soon & Legates (2013) and Steinhilber et al. (2009).

Multifarious other papers on the topic of solar-terrestrial climate relationships are summarized in the NIPCC 2013 report *Climate Change Reconsidered II: Physical Science*, Chapter 3, Solar Forcing of Climate.

Mr. Renowden dismisses the scores of scientists involved in this research area as "cranks". This is not a useful contribution to the debate.

Conclusions

As his 24th criticism of our article, Mr. Renowden chose to challenge our summary statement that *"the obvious conclusion is that the science is not settled"*. Instead, he asserts:

> "*The real climate debate is not a scientific debate, or a debate about the science, it's about how we deal with an issue which is going to shape the lives of everyone over the next few hundred y*

In making this statement, Mr Renowden has openly acknowledged that his concern lies with social engineering, not science.

But reality is that no such engineering can be contemplated until scientific evidence has established beyond reasonable doubt that dangerous global warming is being caused by human-related carbon dioxide emissions.

Unfortunately for Mr. Renowden, despite the creation of the IPCC, the work of thousands of scientists, the expenditure of trillions of dollars and the passing of 25 years, the much simpler hypothesis that remains true is that observed modern weather and climate variations represent natural variability. Furthermore, the DAGW hypothesis, which Mr Renowden favours, is invalidated by the undeniable fact that that no significant increase in global temperature has occurred over the last 18 years despite the release into the atmosphere then of more than 30% of all the human-related carbon dioxide emitted since the beginning of the industrial revolution.

We are surprised also that Mr. Renowden appears to be unaware of the thousands of peer-reviewed publications that have failed to find support for the DAGW hypothesis, many of which have been summarised in the reports of the Nongovernmental International Panel on Climate Change.

We therefore stand by the material written in our original opinion piece, *Hypothetical global warming: skepticism needed*, and leave it to those who have read the material above to judge the credibility of Mr. Renowden's criticisms.

DAGW, and climate change more generally, are complex topics and their understanding is not advanced by ignoring a large part of the available knowledge, nor by denouncing research papers or scientists simply because you don't like the conclusions that they draw.

As commendably initiated by the Science Media Centre in inviting this discussion, the appropriate way to deal with scientific issues of high public interest is for there to be full, frank, open and polite discussion of any matter in hand amongst all who wish to participate.

References

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Bob Carter 12/3/2015 3:14 PM
Comment [1]:
This is already covered in the separate riposte to WRR that is already written.