A reply to John Houghton

Concerning the program "The great global warming swindle"

By

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A REPLY TO JOHN HOUGHTON

SIR JOHN HOUGHTON, *who was co-chairman of the IPCC Scientific Assessment working group from 1988 to 2002, and Director General of the UK Meteorological Office from 1983 to 1991 has recently posted on the Web a blog attacking The Great Global Warming Swindle, a programme broadcast on Channel 4 in the UK on 8 and 12 March 2007. Sir John's attack was inaccurate and unfair. The offending passages are here presented seriatim, with explanations of Sir John's many mistakes in each passage.*

Sir John writes –

> "The most prominent person in the programme was Lord Lawson, former Chancellor of the Exchequer, who is not a scientist and who shows little knowledge of the science but who is party to the creation of a conspiracy theory that questions the motives and integrity of the world scientific community, especially as represented by the Intergovernmental Panel on Climate Change (IPCC)."

Lord Lawson has not at any time played any part in the "creation of a conspiracy theory". He has, however, called for the Intergovernmental Panel on Climate Change to be abolished on the ground that its results are biased and scientifically unsound. He has participated in a House of Lords enquiry which politely concluded that the IPCC's results were indeed questionable.

Sir John writes:

> "1. First, it is important to note that the main lines of evidence for human-induced climate change not addressed in the programme were:
>
> - "growth of carbon dioxide in the atmosphere mainly due to fossil fuel burning to a level greater than for at least 600,000 years;
> - "observations of global warming at the earth's surface (in magnitude and pattern) consistent with the increase in greenhouse gases, the basic science of which has been known and understood for over 200 years."

The programme did not deny that the atmospheric concentration of carbon dioxide is increasing; however, it questioned the extent to which observed warming has been caused by anthropogenic as opposed to natural factors. The surface temperature observations are not entirely consistent with an increase in greenhouse gases: in particular, global temperature fell between 1940 and 1975, while CO_2 concentrations continued to rise, and the IPCC's global warming theory requires that temperatures should have risen during that period.

The magnitude of the natural cooling that is necessary to account not merely for the drop in temperature but also for the cancellation of what should have been the warming effect of CO_2 during that period of more than a third of a century accords to natural climate variability a forcing strength that is denied in the calculations of the IPCC. The cooling over that extended period is particularly hard to explain given that during the past 70 years, including the period from 1940 to 1975, solar activity has been greater, for longer, than during any similar period in at least the past 11,400 years (Solanki *et al.,* 2005).

Sir John writes –

> "2. Climate is always changing TRUE. However, the programme also argued that changes in global average temperature over the last 50 years and as projected for the 21st century are within the range of natural climate variability as observed over the last few millennia. NOT TRUE. Many of the prominent climate changes over past centuries have been regional in scale. Global Warming is concerned with global scale changes. The IPCC 4th Assessment Report Summary for Policymakers has a particular section summarising the conclusions of detailed studies using a wide range of paleoclimate data. It concludes that "Paleoclimate information supports the interpretation that the warmth of the last half century is unusual in at least the previous 1300 years."

Sir John fails to mention the long-running debate in the peer-reviewed literature about the appropriateness of the IPCC's attempt in 2001 to abolish the mediaeval warm period, when temperatures not merely regionally but worldwide appear to have been up to 3C warmer than the present.

See, for instance, McIntyre & McKitrick (2005). McIntyre and McKitrick (2005) are supported by Wegman *et al.* (2005) and North *et al.* (2005) in their finding that the headline 1,000-year graph of northern-hemisphere temperatures by Mann *et al.* (1998; 1999; *corrigendum* 2004) that was reproduced six times in IPCC (2001) and purported to eradicate the mediaeval warm period had a "validation skill not significantly different from zero".

Recent papers from various regions and based on observations ranging from glaciers to stalagmites provide data and graphs demonstrating the existence of the mediaeval warm period, including Bjorck *et al.* (2006); Grinsted *et al.* (2006); Gupta and Anderson (2005); Holzhauser *et al.* (2005); Mangini *et al.* (2005); Pla and Catalan (2005); Qiang *et al.* (2005); Rein *et al.* (2004, 2005); and Williams *et al.* (2004).

There is no longer a consensus to the effect that the mediaeval warm period did not exist. The quotation by Sir John from IPCC (2007) is noteworthy for its failure to assign a confidence

level to the notion that there was no mediaeval warm period, probably because, as North *et al.* point out, data more than 400 years in the past are not reliable.

Sir John writes –

> "3. That carbon dioxide content and temperature correlate so closely during the last ice age is not evidence of carbon dioxide driving the temperature but rather the other way round - TRUE. The programme went on to state that this correlation has been presented as the main evidence for global warming by the IPCC NOT TRUE. For instance, I often show that diagram in my lectures on climate change but always make the point that it gives no proof of global warming due to increased carbon dioxide."

Here, Sir John misquotes the programme, which said that it was Al Gore, in his mawkish and scientifically inaccurate movie, that presented the palaeoclimatological correlation between CO2 concentration and temperature as the key evidence for CO2 as the driver of climate in the present. Though Sir John no doubt tells the truth about this correlation in his lecture, Al Gore does not tell the truth in his movie.

Sir John writes –

> "4. The troposphere is warming less than the surface NOT TRUE. This raises a debate that took place in the 1990s but which has now been resolved. There is now agreement among the scientists involved in measurements that trends in satellite observed tropospheric temperatures when properly analysed agree well with trends in surface temperature observations. The programme also stated that warming should continue to higher levels. That is not the case. In fact, higher levels are observed to be cooling, consistent with the science of global warming that indicates that there is warming below and cooling above the "blanket" of additional carbon dioxide."

Again, Sir John misquotes the programme, in which it was pointed out that not that "warming should continue to higher levels" but that temperature should rise faster in the upper troposphere than at the surface. There has been cooling of the stratosphere (above the troposphere), but the programme did not deny this. Sir John talks of "tropospheric temperatures when properly analysed", but does not admit that until very recently the NASA satellites measuring tropospheric temperatures had their sensors misaligned, suggesting a discrepancy between balloon and satellite data – a discrepancy which, to some extent, still remains. The pattern of observed tropospheric warming is, therefore, only partially in accordance with "global warming" theory, and the programme was correct to point this out.

Sir John writes –

> "5. Volcanic eruptions emit more carbon dioxide than fossil fuel burning: NOT TRUE. In fact, none of the large volcanic eruptions over the last 50 years feature in the detailed record of increase in atmospheric carbon dioxide."

Sir John fails to point out that it is not always easy to distinguish between atmospheric carbon dioxide from volcanoes and carbon dioxide from anthropogenic or natural sources. Since there is an insufficiently long record of global volcanic activity, it cannot be safely said that there has not been an increase in such activity in the second half of the 20th century compared with the first half. The record of increases in atmospheric carbon dioxide is principally directed towards identifying its quantity. It tells us remarkably little about either the sources or sinks of carbon dioxide. And Sir John ought also to have admitted that at present, after 17 years of study, the IPCC is still unable to make the sources and sinks of carbon dioxide balance.

Sir John writes –

> "6. Changes in the sun influence climate TRUE. They cited the Maunder Minimum in the 17th century when no sunspots were observed, as a probable example. Solar influences are the main driver of global average temperature in the 20th century NOT TRUE. Changes in solar output together with the absence of large volcanoes (that tend to cool the climate) are likely to have been causes for the rise in temperature between 1900 and 1940. However, the much more complete observations of the sun from space instruments over the past 40 years demonstrate that such influences cannot have contributed significantly to the temperature increase over this period. Other possibilities such as cosmic rays affecting cloud formation have been very carefully considered by the IPCC (see the 3rd Assessment Report on www.ipcc.ch) and there is no evidence that they are significant compared with the much larger and well understood effects of increased greenhouse gases such as carbon dioxide."

It is inappropriate for Sir John to declare that it is NOT TRUE that solar influences are the main driver of global average temperature in the 20th century. The IPCC says no more than that at least half of the temperature increase of the past *half* century is anthropogenic: it specifically does not say that solar influences were not the main climatic driver before that. Furthermore, there is a growing body of dissenting voices in the peer-reviewed literature who declare that solar influence is the main temperature driver.

For instance, Zhen-Shan and Xian (2007) explicitly state that CO_2 forcing contributes less to temperature change than natural climate variability, that the anthropogenic enhancement of the greenhouse effect "could have been excessively exaggerated"; and that temperature is

likely to fall over the coming 20 years. They conclude that "It is high time to reconsider the trend of global climate changes."

Gerhard (2004), studying the conflict between observational science, theory and politics, says: "Debate over whether human activity causes Earth climate change obscures the immensity of the dynamic systems that create and maintain climate on the planet. Anthropocentric debate leads people to believe that they can alter these planetary dynamic systems to prevent what they perceive as negative climate impacts on human civilization. Although politicians offer simplistic remedies, such as the Kyoto Protocol, global climate continues to change naturally."

Shaviv (2006) considers the cosmic-ray forcing posited by Svensmark *et al.* (2006), and finds that "the sensitivity to radiative forcing changes is $\lambda = \delta T_{global} / \delta F \approx 0.35$K per watt per square metre, at the current temperature" – only 70% of the 0.5K.W^{-1}m^{-2} suggested in IPCC (2001). He says: "If the observed cosmic-ray forcing / climate link is ignored, the best sensitivity obtained is $\lambda \approx 0.54$K.W^{-1}m^{-2} …". Shaviv concludes that, subject to some caveats, "the cosmic-ray forcing / climate link … implies that the increased solar luminosity and reduced cosmic-ray forcing over the previous century should have contributed a warming of ~0.47K, while the rest should be mainly attributed to anthropogenic causes. Without any effect of cosmic rays, the increase in solar luminosity would correspond to an increased temperature of 0.16 +/- 0.04K." In short, if the cosmic-ray forcing hypothesis is correct, natural climate variability rather than anthropogenic enhancement of the greenhouse effect has contributed more than half of the warming over the past century.

Solanki *et al.* (2005) find that "the level of solar activity during the past 70 years is exceptional, and the previous period of equally high activity occurred more than 8,000 years ago … during the past 11,400 years the Sun spent only of the order of 10% of the time at a similarly high level of magnetic activity and almost all of the earlier high-activity periods were shorter than the present episode." Though they say that in recent years more than half the observed warming may be anthropogenic, their palaeoclimatological correlation of solar activity with temperature is cited with approval by Buentgen *et al.* (2006), who conclude that "the 20th-century contribution of anthropogenic greenhouse gases and aerosol remains insecure".

In a controversial paper written from a geological perspective, Khilyuk & Chilingar (2006) provide one of the bluntest and most direct challenges to the climate-change consensus that appears in the peer-reviewed scientific literature. They conclude: "The human-induced climatic changes are negligible. … The global warming observed during the latest 150 years is just a short episode in the geologic history. The current global warming is most likely a combined effect of increased solar and tectonic activities and cannot be attributed to the increased anthropogenic impact on the atmosphere. … Humans may be responsible for less than 0.01°C of approximately 0.56°C (1°F) total average atmospheric heating during the last

century … Any attempts to mitigate undesirable climatic changes using restrictive regulations are condemned to failure. … Thus, the Kyoto Protocol is a good example of how to achieve the minimum results with the maximum efforts (and sacrifices). Impact of available human controls will be negligible in comparison with the global forces of nature. Attempts to alter the occurring global climatic changes (and drastic measures prescribed by the Kyoto Protocol) have to be abandoned as meaningless and harmful."

These and numerous other papers now surfacing in the peer-reviewed literature suggest that Sir John's blunt assertion that the Sun is not the principal driver of climate is unscientific, in that it does not so much as acknowledge the fast-growing corpus of serious papers in the peer-reviewed literature which take a different and less alarmist stance than Sir John.

Sir John mentions the IPCC's dismissal of the solar cosmic-ray forcing in 2001: however, he fails to take account of the literature since then, notably Svensmark *et al.* (2006) and Shaviv *et al.* (2006; *op.cit.*).

Sir John writes –

> "7. Climate models are too complex and uncertain to provide useful projections of climate change - NOT TRUE. In the programme, this was illustrated by a statement made by a youthful Professor Smagorinsky, a pioneer in climate modelling, speaking in the 1980s explaining some of the inadequacies of early models. Climate modelling has developed enormously since then. Modern models include detailed coupling of the circulations of atmosphere and ocean and detailed descriptions of the interactions between all components of the climate system including ice and the biosphere. They have been tested thoroughly in their ability to reconstruct current and past climates. The 30 or more major modelling groups in the world regularly compare their methods and their findings. Contributors to the programme with their parodies of climate models just demonstrated their complete ignorance of the significance and capabilities of modern models."

Sir John somehow fails to mention Lorenz (1963), who, in the landmark paper that founded the science of chaos theory, a major new branch of mathematics, propounded and proved the theorem that the long-run evolution of any "complex, non-linear, chaotic object" (IPCC, 2001) such as climate cannot be predicted unless one knows the initial state of the climate at any chosen instant (T0) to a degree of precision that is not attainable when studying the climate. Here is Lorenz's conclusion –

> "When our results concerning the instability of non-periodic flow are applied to the atmosphere, which is ostensibly non-periodic, they indicate that prediction of the sufficiently distant future is impossible by any method, unless the present conditions are known exactly. In view of the inevitable inaccuracy and incompleteness of weather

> observations, precise, very-long-range weather forecasting would seem to be non-existent."

And climate, of course, is very-long-range weather. Recently another scientist has considered the limitations upon climatic prediction with some care. Giorgi (2005) defines two types of prediction:

> "In the late 1960s and mid 1970s the chaotic nature of the climate system was first recognized. Lorenz defined two types of predictability problems:
>
> 1) Predictability of the first kind, which is essentially the prediction of the evolution of the atmosphere, or more generally the climate system, given some knowledge of its initial state. Predictability of the first kind is therefore primarily an **initial-value** problem, and numerical weather prediction is a typical example of it.
>
> 2) Predictability of the second kind, in which the objective is to predict the evolution of the statistical properties of the climate system in response to changes in external forcings. Predictability of the second kind is thus essentially a **boundary-value** problem."

Giorgi explains:

> "… Because of the long time scales involved in ocean, cryosphere and biosphere processes a first-kind predictability component also arises. The slower components of the climate system (e.g. the ocean and biosphere) affect the statistics of climate variables (e.g. precipitation) and since they may feel the influence of their initial state at multi-decadal time scales, it is possible that climate changes also depend on the initial state of the climate system … For example, the evolution of the thermohaline circulation in response to greenhouse-gas forcing can depend on the initial state of the thermohaline circulation, and this evolution will in general affect the full climate system. As a result, the climate change prediction problem has components of both first and second kind which are deeply intertwined. … The relevance of the first-kind predictability aspect of climate change is that we do not know what the initial conditions of the climate system were at the beginning of the 'industrialization experiment' and this adds an element of uncertainty to the climate prediction."

Giorgi also points out that the predictability of a mathematical object such as climate is adversely affected by non-linearity:

> "A system that responds linearly to forcings is highly predictable, i.e. doubling of the forcing results in a doubling of the response. Non-linear behaviors are much less predictable and several factors increase the non-linearity of the climate system as a whole, thereby decreasing its predictability."

Climatic prediction is, as Lorenz said it was, an initial-state problem. It is also a boundary-value problem. It is also a non-linearity problem. It is also a problem whose evolutionary processes are insufficiently understood. When studying the climate we are in the same predicament as Christopher Columbus. When he set out for the Americas, he did not know where he was going; on the way there, he did not know what route he was following; when he got there he did not know where he was; when he returned he did not know where he had been; and, like very nearly every climate scientist worldwide, he did the whole thing on taxpayers' money.

Sir John's critique of the programme would have been more intellectually honest if he had acknowledged this difficulty. As to his confident assertion that the models are now successfully reproducing all relevant climate events, the models failed to predict the unusual amplitude of the 1998 El Nino event; the 2004 hurricane season that culminated in Hurricane Katrina; the global cooling of the oceans that occurred from 2003 to 2005 (Lyman *et al.*, 2006); the exceptional lengthening of the current solar cycle, which should have ended in 2006 but is not now expected to end for a further year; the sudden cessation of the previously-monotonic increase in atmospheric methane that occurred five years ago; the cooling of much of Antarctica over the past 30 years; and the stabilization of world temperatures, which have shown no global increase since the UN's previous report in 2001. It was only after much rewriting of the software that they managed to provide an *ex-post-facto* representation of the global fall in temperatures between 1940 and 1975. Given these serious, serial failures even on an intra-decadal timescale, and given Lorenz's proof of the impossibility of long-range climatic prediction, rather more humility in making claims for the skill of the general-circulation climate models would have been more intellectually honest.

Sir John writes –

> "8. The IPCC process stifles debate and is used by scientists to further their own self interest: NOT TRUE. I chaired the main meetings of Working Group I during the production of the first three IPCC scientific assessments. I can say categorically that the process was very open and honest. The aim was to distinguish between what was reasonably well known and the areas where there is large uncertainty. The chapter groups had complete freedom to investigate and assess the scientific literature and draw their conclusions."

Paul Reiter of the of the Institut Pasteur, perhaps the world's foremost expert on the *anopheles* and *Aedes Aegypti* mosquito, has studied extensively the malaria outbreak in the then Soviet Union in the 1920s and 1930s, when millions died as far north as Archangelsk. When Reiter was appointed and tried to point out to others on the IPCC that mosquitoes are not tropical and do not select their habitat because of temperature, he was ignored. When he resigned, he had to threaten legal action to get his name taken off the IPCC's report. This is not "complete freedom to investigate and assess".

Sir John writes –

> Contrary to the impression given in the programme, no one ever resigned from being a lead author in Working Group I because of their disagreement with the process or the final content of their chapter. In fact, no one ever communicated to me a complaint about the integrity of the process.

Chris Landsea, an author of the section of Working Group 1 on "global warming" and hurricanes, resigned – and wrote a statement saying that he had resigned, which concluded thus: "I personally cannot in good faith continue to contribute to a process that I view as both being motivated by pre-conceived agendas and being scientifically unsound." Kevin Trenberth, another IPCC lead author, had appeared on a public platform at which it was stated that global warming would increase the frequency of tropical cyclones, when the reverse is more likely to be the case, as Professor Lindzen pointed out in the programme. Sir John is therefore factually incorrect in saying that "no one ever resigned from being a lead author in Working Group I because of their disagreement with the process".

Sir John writes –

> "I should mention, however, a case of disagreement that occurred in Working Group 2 of the IPCC that dealt with the impacts of climate change, a more complex area to address that the basic science of Working Group I. Professor Reiter, who appeared in the programme, described how, unfortunately, his expert work on malaria failed to get recognition in the relevant IPCC chapter. Even Professor Lindzen, who appeared at length on the programme, stayed the course as lead author within Working Group I, expressing his satisfaction with the report's chapters as good scientific documents. He has often, however, gone on to express his view that the conclusions of the Policymakers Summary did not faithfully represent the chapters. But he has never provided any supporting evidence for that statement nor, to my knowledge, has anyone else who has quoted that statement originating from Lindzen.

Professor Lindzen is on public record as having drawn attention to the following instance of the discrepancy between the *Summary for Policymakers* in IPCC (2001) and the chapters whose conclusions were supposed to be summarized –

"To be fair to the authors of Chapter 12 of the IPCC Third Scientific Assessment, here is what they provided for the draft statement of the Policymakers' Summary:

"'From the body of evidence since IPCC (1996), we conclude that there has been a discernible human influence on global climate. Studies are beginning to separate the contributions to observed climate change attributable to individual external influences, both anthropogenic and natural. This work suggests that anthropogenic greenhouse gases are a substantial contributor to the observed warming, especially over the past 30 years. However, the accuracy of these estimates continues to be limited by uncertainties in estimates of internal variability, natural and anthropogenic forcing, and the climate response to external forcing.'

"This statement is not too bad – especially the last sentence. To be sure, the model dependence of the results is not emphasized, but the statement is vastly more honest than what the Summary for Policymakers in the IPCC's Third Assessment Report ultimately presented:

"'In the light of new evidence and taking into account the remaining uncertainties, most of the observed warming over the last 50 years is likely to have been due to the increase in greenhouse gas concentrations.'

"It is sometimes said that scientists cannot think of anything else that could account for warming since the global cooling concerns of the early 70's. Given internal variability, these scientists should think some more instead of treating their models as dice."

IPCC has altered the texts of previous reports prepared by the participating scientists, but without their consent, or has allowed the non-scientific teams who wrote the Summaries for Policymakers to draw conclusions at odds with or not justified by the scientists' texts. Such alterations suggest political interference with scientific conclusions unsupportive of the "global warming" theory.

IPCC (1990)

- The main Report, at page 254, says: "It is not possible to attribute all, or even a large part, of the observed global mean warming to the enhanced greenhouse effect on the basis of observational data currently available". However, the *Summary for Policymakers* removes all these caveats and says, bluntly, that global warming is caused by the "greenhouse effect".

- The Report as written by the scientific participants questions the reliability of current climate models, none of which had been validated by then-existing climate data. However, the *Summary for Policymakers* omits all such doubts and simply predicts a rapid increase in global temperatures, based on climate model calculations.
- The Report as written by the scientific participants stresses the lack of observational data on the distribution of water vapor and on the role of clouds. However, the *Summary for Policymakers* says it is "certain" that water vapor, the most important greenhouse gas, will "further enhance" any warming effect from anthropogenic increases in carbon dioxide.
- The Foreword to the 1990 report, and the 1992 Supplement, both state that the IPCC's texts had undergone "peer review", implying examination by anonymous, scientifically-qualified reviewers independent of the authors. In fact the editors, who were among the authors, circulated the draft to a small group of colleagues and then accepted or disregarded comments according to their own opinion. The editors admitted to "minority" opinions which they "have not been able to accommodate"; but independent surveys of participating scientists demonstrate disagreement by a substantial majority with the *Summary for Policymakers*.

IPCC (1995)

The original Working Group I report on the science of climate change was approved by the IPCC in December, 1995. Subsequent to that approval, IPCC allowed additional edits to the document. Some changes are editorial, serving to add clarification or to correct sentence structure. However, other changes appear to go beyond that and have the effect of changing the substance and tone of chapter 8. The most significant edits made by governmental representatives after the scientific work was completed are identified below. New material is *italicized*, deleted material has a ~~strike through it~~.

Summary

"~~Many but not all~~ *The majority* of these studies show that the observed changes in global-mean, annually-averaged temperature over the last century is unlikely to be due entirely to natural fluctuations of the climate system."

~~"The evidence rests heavily on the reliability of the (still uncertain) estimates of natural variability noise levels."~~

"Furthermore, the probability is very low that these correspondences could occur by chance as a result of natural internal variability. The vertical patterns of change are also inconsistent with the response patterns expected for solar and volcanic forcing."

"Viewed as a whole, these results indicate that *the* observed *trend in* global ~~warming~~ *mean temperature* over the past 100 years is ~~larger than our current best estimates of natural climate variations over the last 600 years.~~ *unlikely to be entirely natural in origin."*

Section 8.1

"The attribution of a detected climate change to a particular causal mechanism ~~can be established only by testing~~ *involves test*s of competing hypotheses."

"The claimed statistical detection of an anthropogenic signal in the observations must always be accompanied by the caveat that other explanations for the detected climate-change signal cannot be ruled out completely, ~~unless a rigorous attempt has been made to do so.~~"

"There is, however, an important distinction between achieving 'practically meaningful' and 'statistically unambiguous' attribution. This distinction rests on the fact that scientists and policymakers have different perceptions of risk. While a scientist might require decades in order to reduce the risk of making an erroneous decision on climate change attribution to an acceptably low level (say 1-5%), a policymaker must often make decisions without the benefit of waiting decades for near-statistical certainty."

Section 8.1.3

"We now have:

* more relevant model simulations, ~~both~~ for the definition of an anthropogenic climate change signal ~~and for the estimation of natural internal variability~~.

* *more relevant simulations for the estimation of natural internal variability, and initial estimates from paleoclimatic data of total natural variability on global or hemispheric scales;*

* more powerful statistical methods for detection of anthropogenic change, ~~and a better understanding of simpler statistical methods~~ and increased application of pattern-based studies with greater relevance for attribution."

Section 8.2.2 Inadequate Representation of Feedbacks

"Deficiencies in the treatment and incorporation of feedbacks are a source of signal uncertainty."

Section 8.2.5

"Current pattern-based detection work ~~has not attempted~~ *is now beginning* to account for these forcing uncertainties."

Section 8.3.2

"*Initial attempts are now being made* ~~For these reasons and many others, scientists have been unable to use paleoclimate data in order~~ to reconstruct a satisfactory, spatially-comprehensive picture of climate variability over even the last 1,000 years. ~~Nevertheless~~, The process of quality-controlling paleoclimatic data, integrating information from different proxies, and improving spatial coverage should be encouraged. ~~Without a~~ Better paleoclimatic data bases for at least the past millennium, ~~it will be difficult~~ *are essential* to rule out natural variability as an explanation for recent observed changes, ~~or~~ *and* ~~to~~ validate coupled model noise estimates on century time scales (Barnett et al., 1995)."

Section 8.3.3.3

~~"While such studies help to build confidence in the reliability of the model variability on interannual to decadal time scales, there are still serious concerns about the longer time scale variability, which is more difficult to validate (Barnett et al., 1995). Unless paleoclimatic data can help us to 'constrain' the century time scale natural variability estimates obtained from CGCMs, it will be difficult to make a convincing case for the detection and attribution of an anthropogenic climate change signal."~~

Section 8.4.1

~~"While none of these studies has specifically considered the attribution issue, they often draw some attribution related conclusions, for which there is little justification."~~

Section 8.4.1.1

"The conclusion that can be drawn from this body of work, and earlier studies reported in Wigley and Barnett (1990) is that the warming trend to date is unlikely to have occurred by chance due to internally-generated variability of the climate system, ~~although this explanation cannot be ruled out. This, however, does not preclude the possibility that a significant part of the trend is due to natural forcing factors.~~ *Implicit in such studies is a weak attribution statement--i.e., some (unknown) fraction of the observed trend is being attributed to human influences. Any such attribution-related conclusions, however, rest heavily on the reliability of our estimates of both century time-scale natural variability and the magnitude of the observed global warming mean trend. At best, therefore,* trend significance *can only provide* ~~provides~~ circumstantial support for the existence of an anthropogenic component to climate change, ~~but does not directly address the attribution issue.~~"

Section 8.4.1.3

"*These empirical estimates of* ~~In summary, such studies offer support of~~ a DT2x are subject to considerable uncertainty, as shown in a number of studies (see, e.g., Wigley and Barnett,

1990; Wigley and Raper, 1991b; Kheshgi and White; 1993b). In summary, such studies offer support for a DT2x value similar to that obtained by GCMs, *and suggest that human activities have had a measurable impact on global climate*, but *they* cannot ~~help to~~ establish a unique link between anthropogenic forcing changes and climate change."

Section 8.4.2.1

"*Implicit in these global mean results is a weak attribution statement--if the observed global mean changes over the last 20 to 50 years cannot be fully explained by natural climate variability, some (unknown) fraction of the changes must be due to human influences*".

~~"None of the studies cited above has shown clear evidence that we can attribute the observed changes to the specific cause of increases in greenhouse gases."~~

Section 8.4.2.3.

"To date, pattern-based studies have not been able to quantify the magnitude of a greenhouse gas or aerosol effect on climate. Our current inability to estimate reliably the fraction of the observed temperature changes that are due to human effects does not mean that this fraction is negligible. The very fact that pattern-based studies have been able to discern sub-global-scale features of a combined CO2 + aerosol signal relative to the ambient noise of natural internal variability implies that there may be a non-negligible human effect on global climate."

Section 8.5.2

"Simultaneous model-observed agreement in terms of changes in both global means and patterns, as in the recent study by Mitchell et al. (1995a), is even less likely to be a chance occurrence or the result of compensating model errors."

Section 8.6

"Finally we come to the ~~most~~ difficult question of ~~all: 'When will the detection and unambiguous attribution of human induced climate change occur ?'~~ *when the detection and attribution of human-induced climate change is likely to occur. The answer to this question must be subjective, particularly* in the light of the very large signal and noise uncertainties discussed in this Chapter, ~~it is not surprising that the best answer to this question is 'We do not know'.~~ *Some scientists maintain that these uncertainties currently preclude any answer to the question posed above. Other scientists would and have claimed, on the basis of the statistical results presented in Section 8.4, that confident detection of a significant anthropogenic climate change has already occurred.* ~~would and have claimed, on the basis of the results presented in Section 8.4, that detection of a significant climate change has already occurred.~~ *As noted in Section 8.1, attribution involves statistical testing of alternative explanations for a detected observed change and* Few ~~if any~~ would be willing to argue that *completely* unambiguous attribution of *(all or part of)*

this change ~~to anthropogenic effects~~ has already occurred, or was likely to happen in the next several years."

"However, evidence from the patterned-based studies reported on here suggests that an initial step has now been taken in the direction of attribution, since correspondences between observations and model predictions in response to combined changes in greenhouse gases and anthropogenic sulphate aerosols:

- *have now been seen both at the surface and in the vertical structure of the atmosphere;*
- *have been found in terms of complex spatial patterns rather than changes in the global mean alone;*
- *show an overall increase over the last 20 to 50 years;*
- *are significantly different from out best model-based estimates of the correspondence expected due to natural internal climatic variability.*

Furthermore, although quantitative attribution studies have not explicitly considered solar and volcanic effects, our best information indicates that the observed patterns of vertical temperature change are not consistent with the responses expected for these forcings.

The body of statistical evidence in Chapter 8, when examined in the context of our physical understanding of the climate system, now points toward a discernible human influence on global climate. Our ability to quantify the magnitude of this effect is currently limited by uncertainties in key factors, including the magnitude and pattern of longer-term natural variability and the time-evolving patterns of forcing by (and response to) greenhouse gases and aerosols."

These changes are substantial, and all or nearly all tend towards exaggerating the supposed threat of "global warming". It seems unlikely that Sir John, who was in charge of the IPCC process at the time, was not aware of these changes. Once again, so disingenuous is Sir John's statement to the effect that such alterations had not been made that a question of lack of intellectual honesty and forthrightness arises.

In the 2007 *Summary for Policymakers,* there were also significant alterations to the scientists' final draft when the political representatives of governments got to work on it. The most notable insertion, probably prompted by a (correct) statement in the *Sunday Telegraph* a few weeks before publication that the IPCC had cut its high-end projection of global sea-level rise to 2100 by a third, was an entire new table, labeled SPM0, which explained the components in sea-level rise. The contributions of the Greenland and Antarctic ice-sheets were overstated by an order of magnitude in the table, which accordingly did not add up correctly. The *Summary for Policymakers,* including the inaccurate table, was duly published, and not one of the journalists reporting on the launch noticed the obvious arithmetical error. Instead, there were numerous reports of the new figures showing the drastic rise in sea level to be expected as a result of the melting of the Greenland and Antarctic ice-sheets, with the usual pictures of glaciers calving spectacularly into the ocean during the early summer thaw (as they do every

year, though this fact is seldom if ever pointed out). Then, when the headlines had been duly achieved, the tenfold exaggeration in the contributions of Antarctica and Greenland to sea-level rise was corrected, without any public announcement, and the new version quietly posted on the IPCC's website. The IPCC had, however, failed to correct another elementary error of arithmetic that had been drawn to its attention: it stated that from 1993 to 2003 the radiative forcing effect of CO2 had increased by 20%. This, too, has attracted worldwide headlines. In fact, the atmospheric concentration of CO2 increased by just 5% in that period, and the forcing effect increased by a mere 1%. This 20-fold exaggeration of one of the fundamental statistics in the *Summary for Policymakers* remains uncorrected.

Sir John writes –

> "It is important to note that IPCC Policymakers' Summaries are agreed unanimously at intergovernmental meetings involving over 200 government delegates from around 100 countries. This agreement is only achieved after several days of scientific debate (only scientific arguments not political ones are allowed) the main purpose of which is to challenge the scientific chapter authors regarding the accuracy, clarity and relevance of the summary and most especially its consistency with the underlying chapters.
>
> "Agreement at such a meeting has ensured that the resulting document, so far as is possible, is scientifically accurate, balanced and free from personal or political bias.
>
> Reference was made in the programme to an article in the Wall Street Journal in 1995 about the 1995 IPCC report accusing the IPCC of improperly altering one of the agreed chapters before publication. This was a completely false accusation as was pointed out in the Bulletin of the American Meteorological Society, September 1996, 77, pp1961-1966.

A leading article in *Nature* in June 1996, while generally supportive of the IPCC, said, "There is some evidence that the revision process did result in a subtle shift … to favour arguments that aligned with the report's broad conclusions. … Phrases that might have been interpreted as undermining these conclusions have disappeared." The lead author of the key chapter that was amended is quoted in *Nature* as saying that he "fine-tuned the wording to bring the report into line with the scientific consensus". *Nature* quoted IPCC officials as saying that the reason for the revision was "to ensure that it conformed to a 'Policymakers' Summary" of the full report. …".

Sir John writes –

> "9. Action on climate change by developed countries may have a negative influence on development of the world's poorer countries POSSSIBLY TRUE. A strong non-

> scientific point made towards the end of the programme concerned the possible effect of pressure from the developed world on developing countries to develop without use of fossil fuel sources of energy. There is something inherently unfair in such pressure that could hamper growth of developing country economies especially when rather little is being done by developed countries to reduce their own fossil fuel emissions. Further, the greater proportion of the damage from climate change will tend to fall on developing countries. The responsibilities of developed countries therefore are clear, first to reduce their own emissions as rapidly as possible and secondly to assist developing countries with resources and skills to develop their energy and other requirements in sustainable ways."

The final sentence of this statement is questionable on elementary scientific grounds. If, as Sir John says, increased carbon dioxide concentrations are a problem, then it is essential to prevent growth in those concentrations not merely in the developed world but also in the developing countries. China, for instance, emits about as much CO2 as the United States. If the United States were to reduce her own emissions unilaterally, while China remained exempt, manufacturing capacity would simply be transferred from the US to China.

Furthermore, as Archibald (2007: in press) demonstrates, the rate of increase in Chinese greenhouse-gas emissions is so great that even if the United States and the European Union were to close down all their industries, do without electricity, transport or any activity that in any way emitted CO2, within just 25 years the *growth* of emissions in China *alone* would entirely replace the emissions of the West. That is why, even under the administration of Bill Clinton and Al Gore, in 1997 the US Senate voted unanimously, 95-0, to pass a law forbidding any US administration to ratify any treaty on greenhouse-gas emissions that did not apply equally to all nations.

Sir John, in his final sentence, reveals his true political allegiance. It is the same as that of Al Gore, who has recently begun to say openly what previously he only dared say privately – that we should favor China by allowing her to increase her emissions unchecked, while making drastic cuts in our own emissions. China is opening one new coal-fired power station every five days till 2012 – recently extended, on some accounts, to 2030. Whatever we in the West now do to try to reduce our own emissions would be mere gesture politics unless all other nations – including China, India, Indonesia and Brazil – were bound by the same restrictions as the rest of us. Nor should we fool ourselves into imagining that if we set a good example the rest of the world will surely follow. It will simply ignore us and take over our industries, one by one, as we price ourselves out of the global marketplace.

Conclusion

Sir John Houghton's blog is inadequate, inaccurate, incomplete, disingenuous, and unfair not only to the makers of *the Great Global Warming Swindle* and to the scientists who in good faith participated in the Channel 4 programme but also to the community of scientists at large who continue to risk loss of grant or of tenure as well as the ridicule of their politically-correct colleagues by daring to test the "global warming" hypothesis rather than cravenly and credulously swallowing every inaccuracy and absurdity. And this was the man who ran the scientific assessment panel of the IPCC for many years. His lamentable blog is an object-lesson in why the IPCC and its error-prone, one-sided, politically-slanted reports should not be given any credence, and why – as Lord Lawson of Blaby has rightly suggested – it should be abolished, forthwith and for aye.

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*Views here expressed are those of the author, and not necessarily those of SPPI.

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