What we are up against, and what to do.

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Global warming alarm has always been a political movement, and opposing it has always been an up-hill battle. In this talk I wish to point out some simple truths that are often forgotten by our side of this issue. First, being skeptical about global warming does not, by itself, make one a good scientist; nor does endorsing global warming make one, *per se*, a poor scientist. Most of the atmospheric scientists who I respect do endorse global warming. The important point, however, is that the science that they do that I respect is not about global warming. Endorsing global warming just makes their lives easier.

For example, my colleague, Kerry Emanuel, received relatively little recognition until he suggested that hurricanes might become stronger in a warmer world (a position that I think he has since backed away from somewhat). He then was inundated with professional recognition. Another colleague, Carl Wunsch, professionally calls into question virtually all alarmist claims concerning sea level, ocean temperature and ocean modeling, but assiduously avoids association with skeptics; if nothing else, he has a major oceanographic program to worry about. Moreover, his politics are clearly liberal. Perhaps, the most interesting example is Wally Broecker, whose work clearly shows that sudden climate change occurs without anthropogenic influence, and is a property of cold rather than warm climates. However, he staunchly beats the drums for alarm and is richly rewarded for doing so.

For a much larger group of scientists, the fact that they can make ambiguous or even meaningless statements that can be spun by alarmists, and that the alarming spin leads politicians to increase funding provides little incentive to complain about the spin.

Second, most arguments about global warming boil down to science versus authority. For much of the public, authority will generally win since they do not wish to deal with science. For a basically political movement, as the global warming issue most certainly is, an important task is to coopt the sources of authority. This, the global warming movement has done with great success.

Thus, for over twenty years, the National Academy had a temporary nominating group designed to facilitate the election of environmental activists. The current president of the academy is one of these. The American Association for the Advancement of Science has been headed by James McCarthy and John Holdren in recent years, and these have been public advocates for global warming alarm. Holdren is now President Obama's nominee for science advisor. There are numerous further examples. How often have we heard a legitimate scientific argument answered by the claim that the alarmist scenario is endorsed by, for example, the American Physical Society (regardless of their lack of expertise in the issue)? How often have you heard innocuous

claims by some society or another taken as endorsements of alarm? How often have you heard that any particular argument has been dealt with by realclimate.org (a clear advocacy website designed to assure warming alarmists that the basis for alarm still exists)?

Thirdly, the success with respect to the second item also gives the climate alarm movement control over carrots and sticks – which, in turn, is what makes it convenient for most scientists to go along. Note that the carrots are as important as the sticks, though the sticks are hardly irrelevant when it comes to support, publication, promotion, etc.

As concerns carrots, for example, John Holdren was long on the board of the MacArthur Foundation which has awarded 'genius' grants to numerous environmental activists. Ironically, an award allegedly honoring the late Bill Nierenberg, a very perceptive and active skeptic of climate alarm who also served as director of the Scripps Oceanographic Institution, is now given annually to an alarmist (most recently to Jim Hansen). One could go on at great length. At the stick end, one simply has to note that *Science* and *Nature* have both publically taken positions against publishing anything that opposes the notion of dangerous anthropogenic warming, while publishing highly dubious science endorsing the notion.

The process of coopting science on behalf of a political movement has had an extraordinarily corrupting influence on science – especially since the issue has been a major motivation for funding. Most funding for climate would not be there without this issue. And, it should be added, most science funded under the rubric of climate does not actually deal with climate, but rather with the alleged impact of arbitrarily assumed climate change. All impacts depend on regional forecasts, and quoting the leading scientist at the European Centre for Medium Range Weather Forecasting (widely regarded as the foremost atmospheric modeling center), Tim Palmer, such forecasts are little better than guesses. From the perspective of alarmism, guesses offer the scope to project anything they wish. These regional guesses are at the heart of numerous state initiatives to 'fight' climate change. These initiatives are usually prepared by the Center for Climate Strategies (CCS), a Pennsylvania-based environmental advocacy group that purports to help states determine for themselves how to develop climate change policies. In reality, according to Paul Chesser of the John Locke Foundation, CCS tightly controls these commissions, who consider proposals mostly from a menu of options presented by CCS themselves. Nearly all the choices represent new taxes or higher prices on energy, increased costs of government, new regulations for businesses, and reduced energy-producing options for utilities, and therefore consumers. CCS is funded largely by a multi-million dollar global warming alarmist foundation, the Rockefeller Brothers Fund.

What can be done? The most obvious point is to persevere, to better understand the science, and to emphasize logic which ultimately has to trump alleged authority. Generally, there is a deep disconnect between consensus statements that commonly only repeat the trivial points that there has been some warming and that man's emissions have caused some part of this, and the claims of catastrophe made by advocates; stress these differences. Note especially that citing various changes that are observed is simply to note that the earth is always changing; it is hardly evidence of man's role in such changes.

With respect to better understanding the science, it is my view that the observations of almost a decade ago that outgoing long wave radiation associated with warmer surface temperatures was much greater than models predicted provided as good evidence as one could hope for that model sensitivities were much too high. However, without an adequate understanding of the physics, the point is largely missed. How can one communicate this to the public? Actually, the science isn't all that hard.

John Sununu (formerly Bush I's chief of staff, governor of New Hampshire, and professor of mechanical engineering at Tufts University) offered an easily appreciated example of positive and negative feedback. In your car, the gas and brake pedals act as negative feedbacks to reduce speed when you are going too fast and increase it when you are going too slow. If someone were to reverse the position of the pedals without informing you, then they would act as positive feedbacks: increasing your speed when you are going too fast, and slowing you down when you are going too slow.

Stress that alarming predictions depend critically on the fact that models have large positive feedbacks. The crucial question is whether nature actually behaves this way? The answer may well be no.

In the common (though admittedly somewhat inaccurate) picture of the greenhouse effect, greenhouse substances (mainly thin high clouds and water vapor, but also CO_2, methane, freons, etc.) act as a blanket, inhibiting the emission of infrared (heat) radiation. We know that in the absence of feedbacks (in which water vapor and clouds allegedly act to amplify the effect of added CO_2), an increase in temperature will lead to a certain increase in this heat radiation (also known as outgoing longwave radiation, OLR). With positive feedbacks, this amount of radiation will be reduced (in terms of the 'blanket' imagery, the blanket has gotten thicker). Current models do, indeed, predict this. The feedback processes actually operate on very short time scales, and the earth's temperature also undergoes relatively rapid fluctuations (associated with internal phenomena like El Nino). In response to such fluctuations, the emitted heat radiation will also fluctuate. As we see in the accompanying figures from a paper by Wielicki et al (2002), the actual fluctuations in heat radiation are substantially greater than those produced by models forced by the observed temperature fluctuations. They are also greater than what would be expected in the absence of feedbacks. This implies that nature is, as any reasonable person might suppose, dominated by stabilizing negative feedbacks rather than destabilizing positive feedbacks. It has been noted that the climate in models is an example of unintelligent design – something modelers are far more capable of than is nature.

Getting people (including many scientists) to understand this is crucial. Once it is understood, the silliness of the whole issue becomes evident – though those who are committed to warming alarm as the vehicle for a postmodern coup d'etat (or illicit profits) will obviously try to obfuscate matters. Although the above results were confirmed by at least four other groups, there did appear a paper in 2006 by Wong, Wielicki et al that attempted to eliminate the observed discrepancy with models by adjusting the data. In this particular case, satellite orbital decay was shown to largely reduce the secular change in emitted heat radiation between the 80's and 90's. However, the episodic fluctuations remained substantially greater than those produced by the models. It is an

interesting feature of climate science that when data disagrees with models, the data is inevitably 'corrected' to eliminate the disagreement. The 'corrections' in my experience are not implausible; the data, after all, is subject to numerous uncertainties. However, the fact that such changes inevitably act to bring the data into better agreement with highly uncertain models is, in fact, highly implausible.

As important as the above is, it does not eliminate the need for more institutional approaches. These are limited by the minimal resources available to rectify the present situation. Indeed, given the minimal resources available to those who are truly interested in how climate actually works, and the immense resources and power of the environmental movement, it is astounding that resistance has been as effective as it has been. That said, one should not underestimate the impressive degree of organization behind the climate alarm movement. Notable, in this regard, has been the Climate Action Network that has coordinated the activities of hundreds of environmental NGO's since 1989.

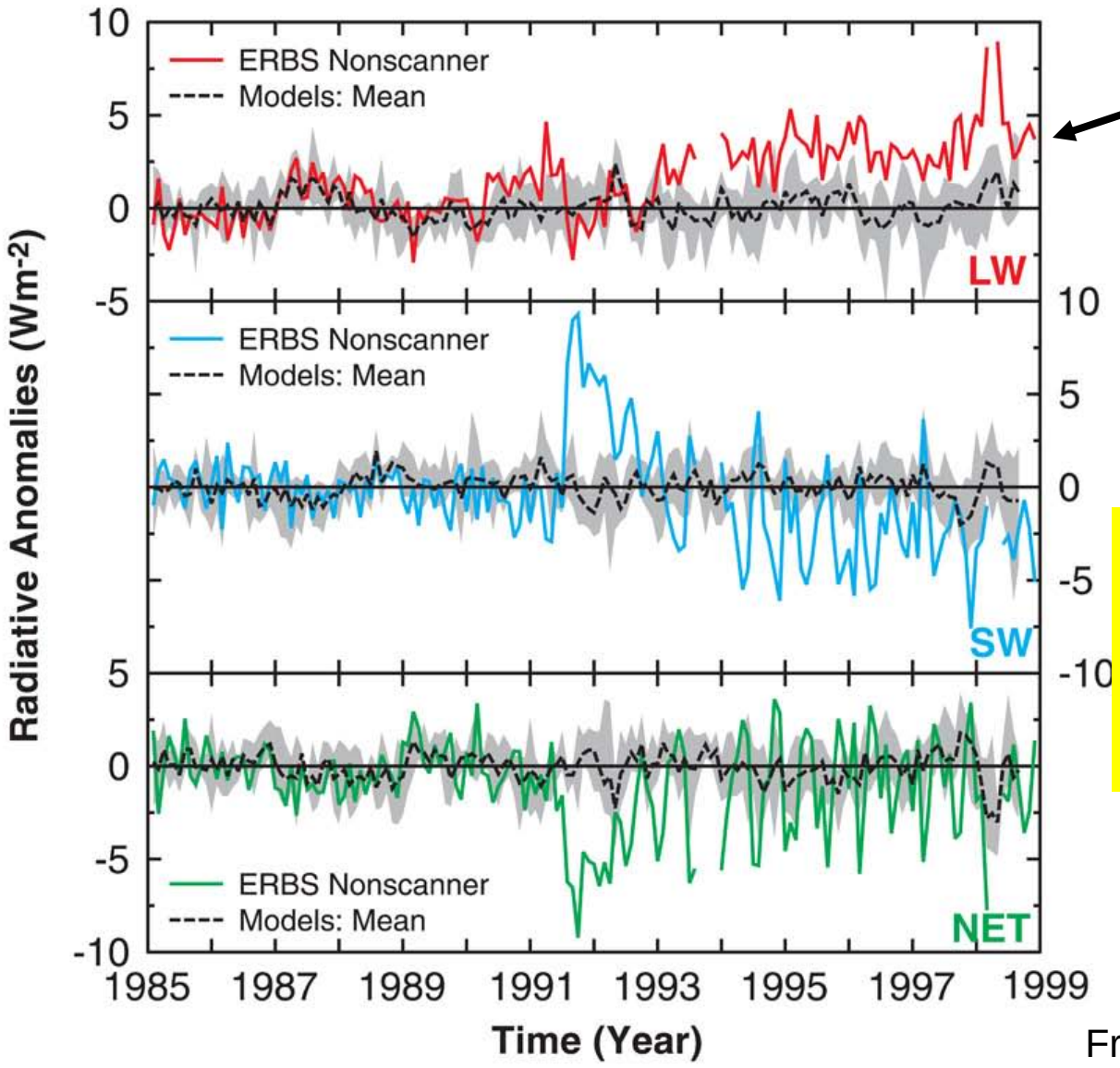
However, should some benefactor create a climate institute that could recruit outstanding scientists regardless of their position on global warming, and provide the resources for truly independent research protected from political manipulation, then it is possible that the corrupt state of the science could, in time, be rectified. So far, however, this would appear to be a pipe dream.

A possibly more practical undertaking would be to undermine the authority of scientific organizations wherein a few activist members have managed to speak for the entire membership. A major campaign is needed to get thousands of scientists to resign from professional societies that have taken unrepresentative stands on the warming issue, while making the reason for the resignation unambiguous and public. This would, in my opinion, be far more effective than simply collecting thousands of signatures for petitions.

The global warming issue has done much to set back climate science. In particular, the notion that climate is one dimensional which is to say that it is totally described by some fictitious global mean temperature and some single gross forcing *a la* increased CO_2 is grotesque in its oversimplification. I must reluctantly add that this error is often perpetuated by those attempting to 'explain' climate with solar variability. Unlike greenhouse forcing, solar forcing is so vague that one can't reject it. However, acting as though this is the alternative to greenhouse forcing is asking for trouble simply because it endorses the incorrect paradigm underlying AGW. Remember, we are dealing with a small amount of warming (concentrated in two relatively brief episodes) in an inadequately observed system. The proper null hypothesis is that there was no need whatsoever for external forcing in order to produce such behavior. The unsteady and even turbulent motions of the ocean and atmosphere are forever moving heat from one place to another on time scales from days to centuries, and, in doing so, they leave the system out of equilibrium with the sun leading to fluctuations in temperature. The thought that these turbulent fluctuations demand specific causes is absurd – almost as absurd as calling for specific causes for each whirl in a bubbling brook.

Finally, I would suggest that however grim things may appear, we will eventually win against

anthropogenic global warming alarm simply because we are right and they are wrong. There are many reasons for being confident of this. However, we have just gone over one of the most important scientific reasons. The satellite records of outgoing heat radiation show that the climate is dominated by negative feedbacks and that the response to doubled and even quadrupled CO_2 would be minimal. In a field as primitive as climate science, most of the alleged climate scientists are not even aware of this basic relation. And these days, one can be confident that once they are, many will, in fact, try to alter the data. Under the circumstances, it is not surprising that the public is not likely to understand this as well. On the other hand, the fact that the global mean temperature anomaly has not increased statistically significantly since at least 1995, does not actually disprove anthropogenic global warming, but for the public this fact is likely to be crucial. For some of us, this is an occasional source of frustration, but one must always remember that this is a political rather than a scientific issue, and in a political issue, public perception is important. Moreover, the temperature record does demonstrate at least one crucial point: namely, that natural climate variability remains sufficiently large to preclude the identification of climate change with anthropogenic forcing. As the IPCC AR4 noted, the attribution claim, however questionable, was contingent on the assumption that models had adequately handled this natural internal variability. The temperature record of the past 14 years clearly shows that this assumption was wrong. To be sure, this period constitutes a warm period in the instrumental record, and, as a result, many of the years will be among the warmest in the record, but this does nothing to mitigate the failure of nature to properly follow the models. To claim otherwise betrays either gross ignorance or grosser dishonesty (see Figures 2 and 3 from data from the UK Meteorological Office). When it comes to global warming hysteria, neither has been in short supply.



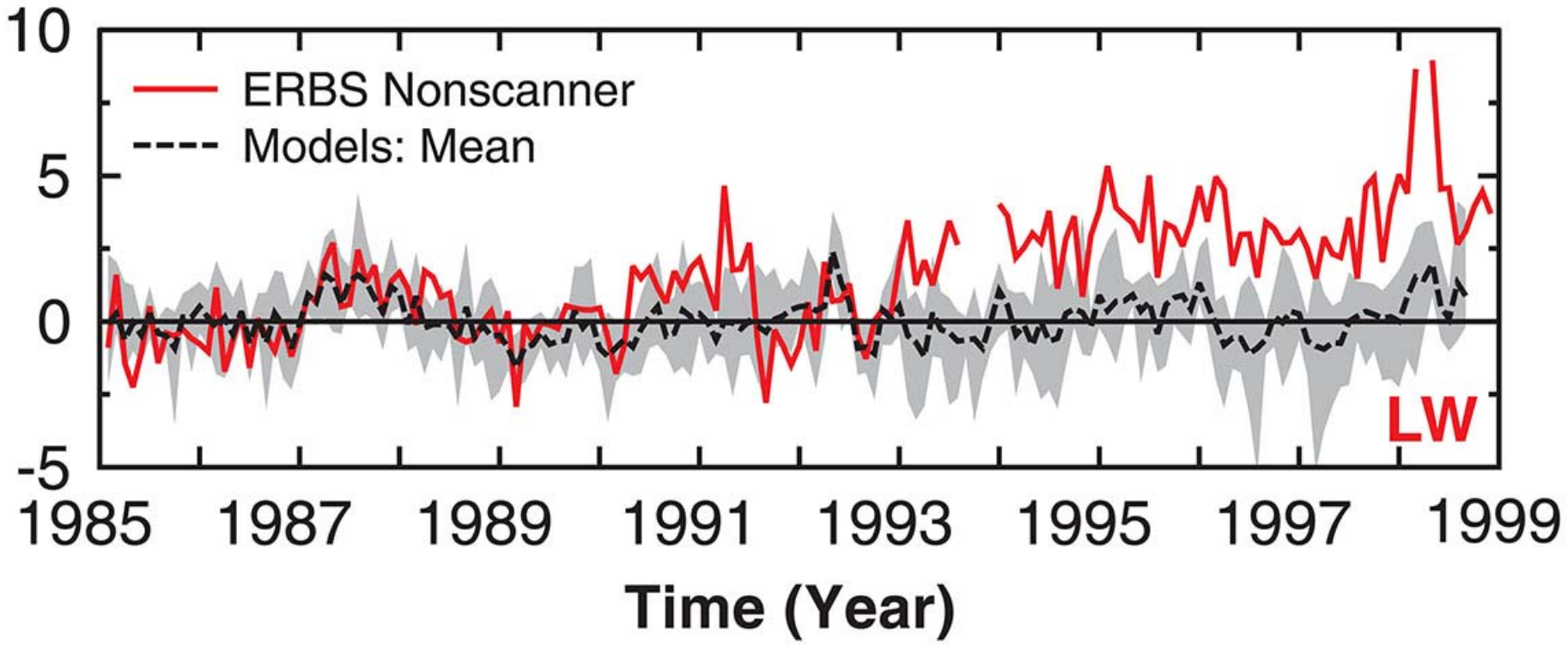
In this obscure diagram we actually have a crucial piece of information that tells us that models are greatly exaggerating climate sensitivity.

It tells us that the greenhouse blanketing effect in models is about 7 times greater than it is in nature.

From Wielicki, Lin et al, 2002

Figure 1

Let us examine the top figure a bit more closely.



From 1985 until 1989 the models and observations are more or less the same – they have, in fact, been tuned to be so. However, with the warming after 1989, the observations characteristically exceed 7 times the model values. This corresponds roughly to a sensitivity of 0.5C for a doubling of CO_2. Note that the ups and downs of both the observations and the model (forced by observed sea surface temperature) follow the ups and downs of temperature (not shown).

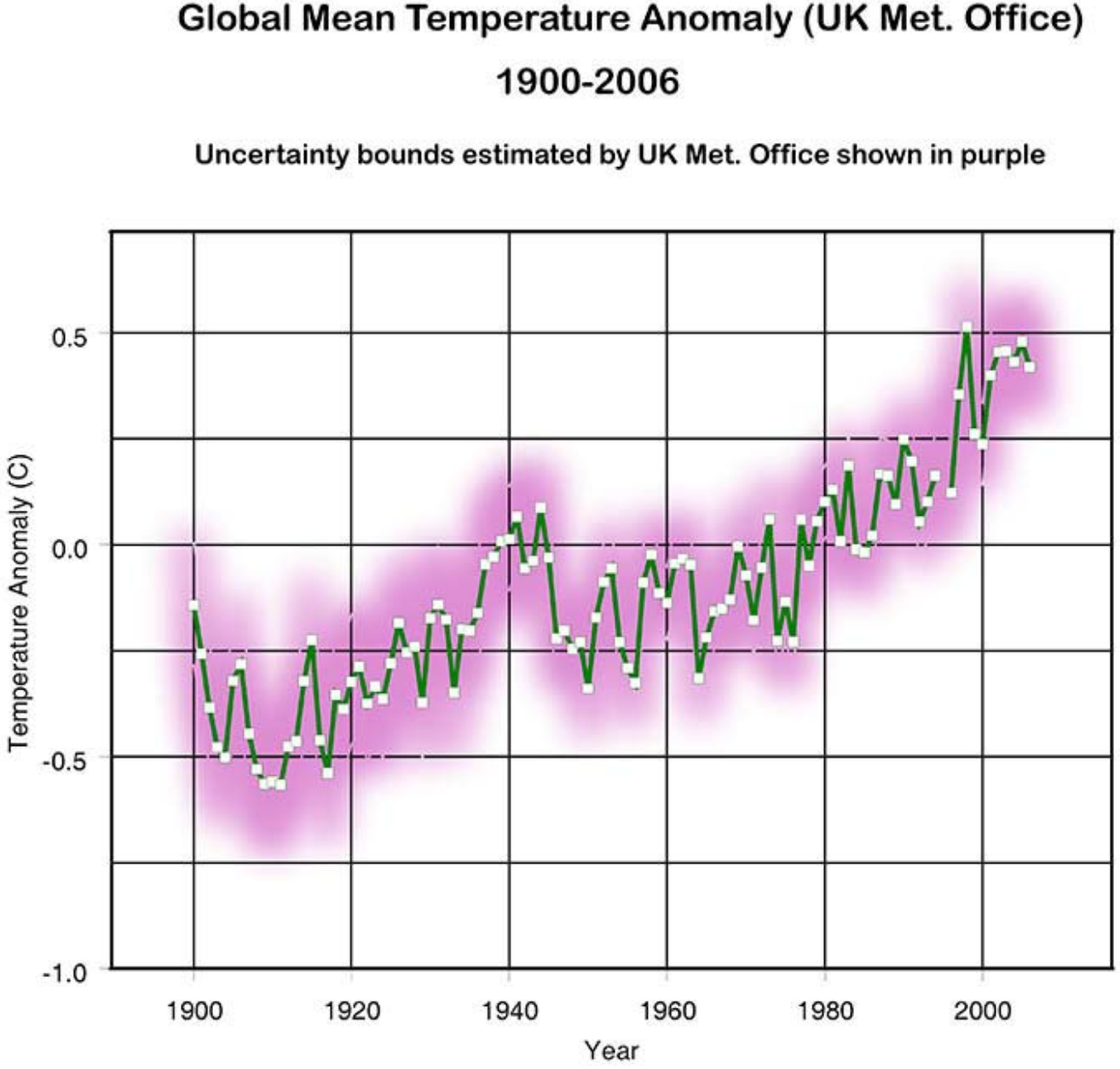

Global Mean Temperature Anomaly (UK Met. Office)
1900-2006
Uncertainty bounds estimated by UK Met. Office shown in purple
Temperature Anomaly (C)
0.5
0.0
-0.5
-1.0
1900
1920
1940
1960
1980
2000
Year

Figure 2

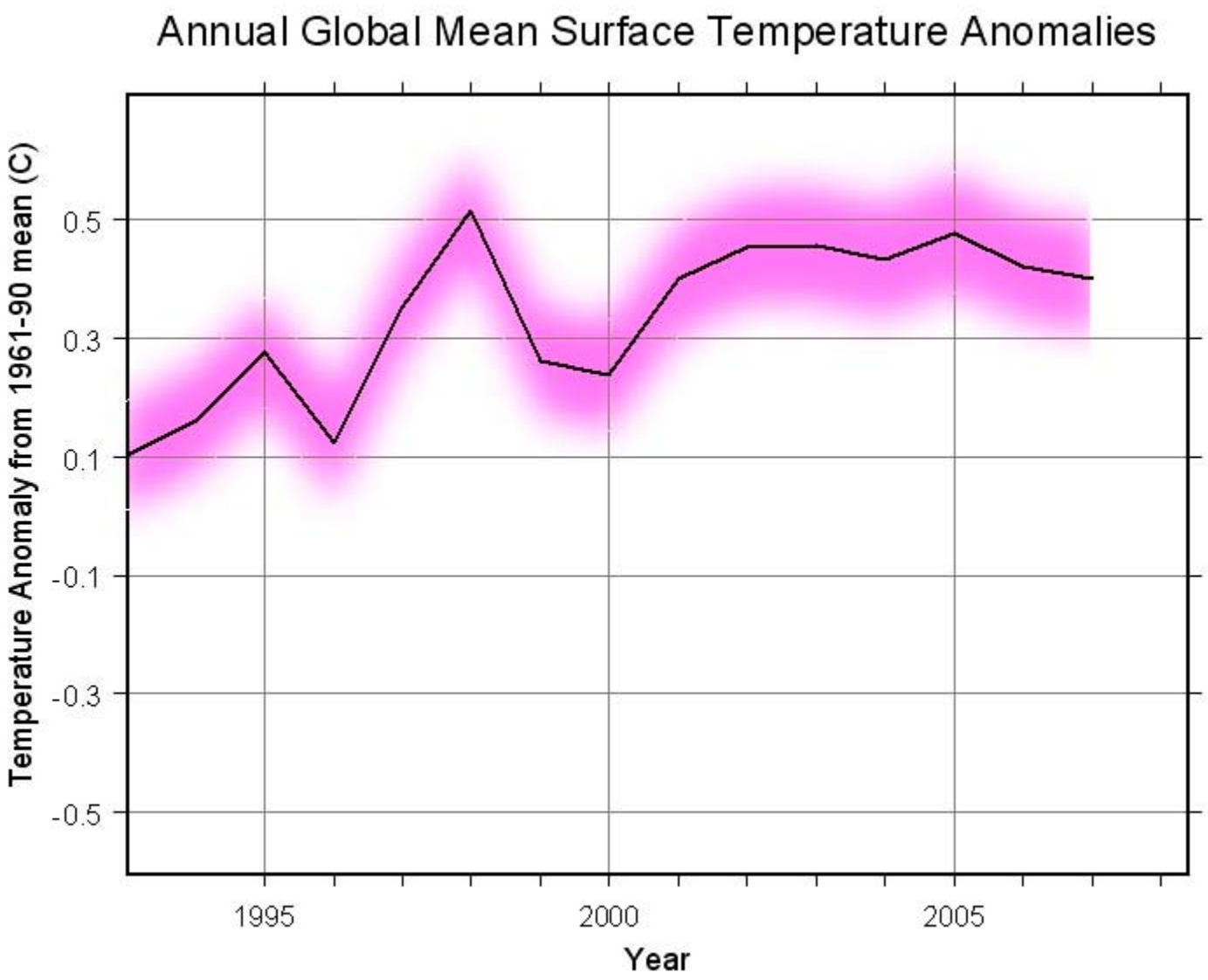

Annual Global Mean Surface Temperature Anomalies
Temperature Anomaly from 1961-90 mean (C)
0.5
0.3
0.1
-0.1
-0.3
-0.5
1995
2000
2005
Year

Figure 3