

THE REFERENCE FRAME

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JOHN COOK: SKEPTICAL SCIENCE

John Cook, a former student of physics in Australia, has constructed an interesting website trying to attack the opinions of climate skeptics.

Skeptical Science: Getting skeptical about global warming skepticism

It's been in my climate bookmarks for quite some time but no one really cared about it so I didn't want to respond. However, his talking counter-points were recently adopted by an iPhone application. Moreover, Andrew Revkin promoted the website, too. So let us look at his points and counter-points.

On his website, you can currently see 102 observations by the skeptics (or some skeptics); 2 of them were added by March 29th and I can't constantly update this web page so that he's likely to surpass his 104 points sometime in the future. Each of the "slogans" is accompanied by a short attempted rebuttal by John Cook. And if you click it, you get to a long rebuttal. So let's look at them:

1. **It's the sun:** *I agree with Richard Lindzen that it's silly to try to find "one reason behind all climate change", because the climate is pretty complex and clearly has lots of drivers, and this applies to the opinion that "everything is in the Sun", too. Cook shows that the solar irradiance is too small and largely uncorrelated to the observed changes of temperatures. I agree with that: a typical 0.1% change of the output is enough for a 0.025% change of the temperature in Kelvins which is less than 0.1 °C and unlikely to matter much. But I find it embarrassing for a student of solar physics such as himself to be so narrow-minded. The Sun influences the Earth's atmosphere not only directly by the output but also indirectly, by its magnetic field and its impact on the cosmic rays (via solar wind etc.) and other things. He has completely ignored all these things. Of course, I am actually not certain that these effects are very important for the climate but the evidence - including peer-reviewed articles - is as diverse as the evidence supporting CO₂ as an important driver.*
2. **Climate's changed before:** *Cook says that the previous history of the climate shows that the climate is sensitive to imbalances. Indeed, it is and it has always been. And he says that the past history provides evidence for sensitivity to CO₂. Well, it virtually doesn't. CO₂, much like other effects, adds imbalances and pushes the temperature around. But there exists no way to disentangle CO₂ from many other effects or argue that it has become the most important driver. So the climate continues to change in the same way as it did in the past, by the typical changes per year, decade, and century, and Cook has offered no evidence whatsoever that something has changed about the very fact that the climate is changing.*
3. **There is no consensus:** *This counter-point #3 is clearly obsolete: Cook tries to argue that 97% climate scientists endorse something - it sounds like a TV commercial. Most of his graphs are obsolete, too - the current support for various AGW-related*

statements is close to 1/2 of the figures he copied in an "optimistic" moment for his favorite political movement. The reality is that most scientists disagree with the basic tenets of the AGW orthodoxy - and even people like Phil Jones now agree that nothing unprecedented is going on with the climate right now (including no statistically significant warming in 15 years, and the existence of a medieval warm period), while Kevin Trenberth has agreed that the climate hasn't warmed and the popular models are inconsistent with this fact - what a travesty. There still exist large bodies of climate scientists who prefer to promote the panic - because they've been hired to do so or because it results from their political biases (which are mostly leftist in the Academia). The funding for climate science has increased 10-fold in the last 10-20 years - purely because of the possible threat - which means that 90% of the people (or 90% of the funding) is working on proofs of this pre-determined conclusion. At any rate, these discussions provide us with no evidence for the actual science - they're just about an attempt of the largely political movements to intimidate the scientists in the very same way in which Nazis wanted to intimidate the "Jewish science" by the consensus of the "Aryan scientists". Einstein would tell them that it's enough to find one scientist to prove Einstein wrong.

4. **Commercial break:** United Nations are losers in a new scandal, the HamburgerGate. They had to admit that their figure 18% for the percentage of the greenhouse warming coming from eating meat was due to mixing apples and oranges (which contain no meat): they included all related emissions for meat but not for other sectors
5. **It's cooling:** Again, Cook's graphs and statements are obsolete and a few years from the moment he wrote the page were enough to falsify his new predictions about the accumulating heat. The reality is that between 1998 or 2001 or other years on one side and 2009 on the other side, the global mean temperature dropped. Sometimes it's cooling, sometimes it's warming. The year 2010 is likely to be much warmer than 2009, approaching the temperatures of 1998, but when the El Nino fully switches to a La Nina, things can be very different. The fact that there's been no significant warming for 15 years has been accepted by both sides of this debate. And since 1998, it's just cooling. Cook has no counter-arguments. He just says that the heat flows influence the temperature and I agree with that. Except that he doesn't show in which way the flows are going to go e.g. in the next 10 years.
6. **Models are unreliable:** Cook says that models have made predictions that were successfully compared to observations. Except that this is not enough for the models to be reliable. For them to be reliable, it would have to be the case that the models have produced no predictions that were inconsistent with the observations - because one wrong prediction is enough to falsify a model. Clearly, such falsification has taken place with all of them. In particular, all IPCC-endorsed models predicted a warming since 1998 that didn't occur. They're gone. Again, both sides agree that we can't rely on them. Kevin Trenberth agrees that the disagreement of the models and the data is a travesty. There are hundreds of recent examples showing how deeply flawed the existing IPCC-endorsed models are.
7. **Temp record is unreliable:** In his counter-point, Cook talks about the urban heat island effects that are "negligible". Well, they're surely not negligible because the estimated urban warming in typical large cities exceeds the whole assumed warming

caused by CO₂ - something like 0.6 °C. So it matters a lot whether the urban effects are isolated. But the urban effects are far from being the only problem with the surface temperature record. The number of recently found dramatic problems with the surface record is so huge that I can't even enumerate them here.

8. **It hasn't warmed since 1998:** Cook claims that the Earth continued to accumulate heat. If you check his evidence, you will see that it is a circular reasoning because the sources also use the models in which the warming should have continued. The fact is that no warming has occurred since 1998 so it's likely that there's also no warming in the "pipeline". Cook emphasizes that 1998 was a year of a strong El Nino. Of course, it was, but it was not unprecedented or unrepeatable. The most recent El Nino episode reached more than 2/3 of the maximum of the 1997/1998 El Nino episode. So they're surely comparable, to say the least. If 2010 will match the temperatures of 1998, it still means that the "trend-like" warming per 12 years is only comparable to 1/3 of the effect of one El Nino, or 1/6 of the difference between an El Nino and La Nina peaks. It's very small.
9. **Ice age predicted in the 70s:** Cook claims that these predictions were largely media-based. Well, the same is true about the current global warming alarm. It's mostly media-based and good scientists are simply not working on such conspiracy theories. It's still true that less good scientists are working on them, and they were also working in the 1970s. Sometimes it's the very same people. For example, Rasool and Schneider predicted a new ice age in 1971 - in an article in Science. The relative importance of the "scientific community" and the "media" is pretty much the same as it was in the global cooling alarm in the 1970s - the recent global warming hysteria just got far more severe than the global cooling hysteria 35 years ago.
10. **We're heading into an ice age:** Cook claims that CO₂ beats all other things. At some point in the future, this statement will of course become ridiculous. Ice ages may be 10 °C cooler than the interglacials. Because of the logarithmic character of the greenhouse warming, one can't ever compensate 10 °C of cooling by an added CO₂ because the concentration would have to jump something like 256-fold. It's clear that a "big" ice age will return in a multiple of 10,000 years and the people will only be able to deal with it if they have a much stronger technology than the current ones. Also, a "little" ice age may return within a century, and a possible cooling by 2 °C, as seen historically, will be greater than the effect of the CO₂.
11. **Antarctica is gaining ice:** Cook claims it's not, when looked at the whole continent. Well, the graphs of the sea ice area in the Northern and Southern Hemispheres show that both of them are very near the normal levels right now, as extracted in the last 30 years or so. In the last 50 years, Antarctica was cooling, but such things are due to many coincidences. It is completely plausible that in the next 50 years, it will be the Arctic that will be cooling. It's preposterous to promote these random changes to "signals from God": the huge variability of the polar regions is a rule rather than an exception.
12. **CO₂ lags temperature:** Cook uses the usual talking counter-point, trying to say that the influence goes in both directions. Qualitatively speaking, it's right. Quantitatively speaking, the influence of CO₂ on the temperature during the ice age cycles has been so much weaker than the opposite influence that it is pretty much undetectable and remains a theoretically justified by empirically unsupported speculation. It's clear that

the outgassing etc. - the influence of temperature on the concentration of gases - explains the bulk of the correlation between the temperature and the concentrations as seen in the Vostok ice core (and others). It's a very important that the Vostok charts provide us with no evidence of the greenhouse effect and whoever is saying something else is a liar: Al Gore has been caught as one of them but there are many. More generally, it's preposterous to pretend that the greenhouse effect is "on par" with the opposite effects because it's at least one order of magnitude smaller and undetectable in practice.

13. **Al Gore got it wrong:** According to Cook, despite small errors, AIT is consistent with science about the basic questions. What a complete nonsense. Courts in the U.K. enumerated 9 major errors - and there are dozens of other errors that have been admitted - and especially because of the overall misleading alarmist bias of the movie that couldn't be supported by the science, the judge allowed the movie to be screened only if the teachers also explain the kids what the errors are and why the movie is just a political propaganda. Even though the movie is just 5 years old, it's already clear that it failed the test of time. All the details predictions have been falsified - for example "new record hot years" that should follow 2005, strengthening hurricanes that should have flooded parts of Florida by now, and so on. Scientifically speaking, the movie is complete garbage and whoever doesn't realize this trivial fact shouldn't be treated as a serious party in discussions.
14. **Global warming is good:** Cook claims that the negative impact on agriculture, health, economy, and environment outweighs any positives. In reality, the overall impact is positive in all four cases. The agriculture becomes more effective, is able to feed people more easily, the economy grows, the fees for heating go down (and they exceed the money paid for cooling today). Cook's statement is preposterous: if there were warming, it would be beneficial for life on Earth and the human society, too. Even 5 °C of warming would be a net positive. Cook's methodology to "prove" that the negatives win is completely absurd. He first decided how many "positives" and "negatives" he allows in each category (so that the negatives dominate), and then he randomly added a few papers supporting them. That's a completely wrong methodology. If he actually calculated the effects on agriculture in dollars rather than in "talking points" (whose number was predetermined, anyway), he would see that the positives outweigh the negatives by an order of magnitude or more.
15. **It's freaking cold:** He correctly says that a few extreme local weather episodes aren't enough to calculate the global or long-term trend. However, it's exactly the alarmist movement - and the likes of Al Gore - who would be making this error all the time. I agree that the record-high/record-low ratio has dropped to one-half or so. But this change is unspectacular. In some counting, it is just a 1-sigma effect because the numbers are comparable: you can say that the overall warming that's been accumulated hasn't yet reached one times the normal noise. Clearly, the ratio can continue to grow in the future but this is what would happen given the same change of the temperature, whatever its reason is. The longer record we have, the more we deviate from the temperatures at the beginning - whether the cause is natural or man-made - and the more extreme ratio of hot or cool records (in either direction) we have to get. There's nothing to be surprised by here.
16. **Hurricanes aren't linked to global warming:** Cook says that while he's uncertain

about the frequency, intensity goes up. Again, this argument could have sounded OK a few years after 2005 when his article was written but in 2010, it's preposterous. The data just don't show any increase of the intensity and the most recent 4 seasons - all of them were among the quieter ones on the record. The data don't show it and the theory doesn't imply what he says, either. The hurricanes are driven by temperature gradients, and because the global warming should influence primarily the polar region, and therefore reduce the polar-tropical differences, it should reduce the storminess, too.

17. **Mars is warming:** Mars temperatures are driven by dust and albedo, we learn, and there's "no evidence" of a "long-term warming". Well, the dust and albedo are arguably important on the Earth, too - among other things - and the evidence of a "long-term warming" is comparable on both planets (and other planets). Some changes of the Martian dry ice caps seem more dramatic than what we are observing here on Earth. Which of the planets is more able to preserve a constant temperature is a subtle question - and I actually think it is the Earth. But the qualitative observation that both planets show some change and follow the same laws of physics is a basic conclusion of the scientific reasoning. Only crazy people could disagree with it. Clearly, if the trends on all planets tend to be correlated, it's some evidence for a solar or astronomic origin of the changes.
18. **Cosmic rays:** I appreciate Cook's balance in this point. He agrees that it's an open question whether the cosmic rays affect the climate, but points out that certain previously working correlations broke down recently - so that the correlations in the last 30 years seem significantly weakened when looked at globally. I agree with that. But that doesn't yet rule out all conceivable variations of the theory claiming that the cosmic rays matter. I think that many of the cosmic rays climatic correlations continue to be much more convincing than the CO2-temperature ones.
19. **1934 - hottest year on record:** Cook says that the U.S. is just 2% of the globe. Well, it is just 2% of the globe but it's giving us a hugely higher percentage of reliable temperature data that go back to 1900 or so simply because the data density is proportional to the "density of advanced civilization". So there may be other regions that do show some warming from the 1930s but they're (even) much less reliable than the U.S. record. The U.S. record simply does matter, despite its mistakes. Moreover, the U.S. temperatures are what the Americans should be primarily interested in, anyway. The idea that the global temperatures are more important for the Americans than the national/regional/local ones is preposterous.
20. **It's just a natural cycle:** Cook claims that the "recent global warming" is the first one in which both hemispheres change in the same direction. That's ludicrous. In the history, the "aligned" trends on both hemisphere were more frequent than the "opposite" trends. After all, the whole Earth was cold in ice ages. The idea that the heat is just moving from one hemisphere to another, as long as natural factors dominate, is scientifically naive. Most of the heat transfer is between the Earth and the outer space - vertical radiation - and changes of the local albedo, cloudiness, and perhaps even greenhouse gases matter. There are lots of natural cycles that are indisputably real and if Mr Cook believes that he can distinguish the recent changes from all of them by a 3-word argument, then he is crazy.
21. **It's urban heat island effect:** He claims that it hasn't affected the trends. It's just

ludicrous. As the cities go bigger, the effect is getting stronger, and because most weather stations are in cities or close to cities, we get a possible source of bias that is as large as 1 °C per century. The idea that we can neglect this effect when interpreting the surface measurements of temperature is extremely careless.

22. **Sea levels don't rise:** *By many methods, he "shows" that the rise has been "accelerating" in the last 100 years. However, the first graphs he includes also show that the rate has been "decelerating" since 1990 - and almost no change since 2006. He doesn't discuss these observations. He only cherry-picks "bumps" in the data that are convenient for his predetermined religious message. The fact is that the observed sea level rise is sometimes accelerating, sometimes it's decelerating, it can also go negative, but it's surely negligible. Realistic estimates of the sea level rise until 2100 go from -10 cm to +50 cm. Whatever the final answer is, they will pose no problem and they will be an order of magnitude below the rate measured when the Earth was exiting the last ice age (when the continental ice sheets could still melt).*
23. **Arctic icemelt is a natural cycle:** *John Cook says that it's melting and it's great because that's what the models predict. Too bad for the models because the Arctic sea ice are has returned back to the normal (average in the last 30 years). But I guess that such a wrong prediction is not a problem for John Cook: he's only interested in the successful predictions and thinks that wrong predictions are not a problem for a theory.*
24. **Hockey stick is broken:** *Cook claims that many newer papers have produced the same hockey stick. Papers written by Mann's allies, using the same errors and distortions, could have done this job, but serious science has definitely rejected the hockey stick as the shape of the reconstructions. Newer, better, independent reconstructions simply do not look like a hockey stick. The Medieval Warm Period is back, too - it's been agreed even by people such as Phil Jones. Mann's methodology belongs to the darkest chapters of the history of science.*
25. **Water vapor is the most powerful greenhouse gas:** *Cook agrees that H₂O is the number one - but he interprets H₂O as a slave whose goal is to amplify the warming effect of CO₂. This description by Cook is a classic "tail wagging the dog". Quite generally, it is almost impossible for a "big effect" to become a "slave" to a "small effect". The water vapor concentration is affected by most other components of the climate system, too. CO₂ is just a small factor influencing H₂O. Moreover, H₂O is also able to create clouds which, if low-lying, have a powerful cooling effect on the climate. Whether the net feedback caused by H₂O is positive or negative remains to be seen but there are many "first-order" effects caused by H₂O itself that don't depend on CO₂ in any way.*
26. **Other planets are warming:** *Cook offers three counter-arguments: not all of them are warming; the Sun has been cooling since 1950; explanations of the warming of some planets exist. Well, not all planets are warming - the Earth is not warming 100% of the time, either. Different celestial bodies have different "inertia" and lags etc. The Sun has been "cooling" only when we look at the total output which is unlikely to be the key method how the Sun affects the planets: as we've mentioned, there are much more significant changes linked to the solar magnetic field etc. that Cook completely neglects. Finally, explanations may exist for other planets, but whether they're correct is far from obvious. There are proposed explanations for the*

Earth's changes, too. Clearly, Cook wants to instantly accept hypotheses that are convenient to him while he wants to infinitely obstruct the proposed hypotheses that are inconvenient. One can't do science with a bias that is as huge as his.

27. **Greenland was green:** He agrees but says it was a local phenomenon. Again, this could be true or not. It is actually unlikely for the temperature of a large region to stay anomalous warm, relatively to the surrounding regions, for centuries. Interestingly enough, similarly local observations of the Arctic today are considered to be one of the arguments that Cook likes. Again, there are clear double standards here. All these arguments - in both ways - are vague and surely not "exact". A slight bias in the method which arguments are accepted is enough to reach completely wrong conclusions which is what Cook does.
28. **Human CO2 is a tiny % of CO2 emissions:** I agree with him on this point. He correctly says that while there are larger sources and sinks, they naturally cancel with a big accuracy, while the human contribution doesn't cancel, which is why the CO2 concentration is higher than in the last 800,000 years. I agree with that. It's still 10-20 times smaller than it would be half a billion years ago - when the temperature was not too different from the present one. It's also 20 times smaller than the concentration needed for people to start to feel dizzy. It's an innocent concentration of a harmless gas that has become the pillar for the life as we know it today - it's the plant food that doesn't harm animals, either.
29. **Oceans are cooling:** I don't think that we have too reliable data on this point. Clearly, the oceans were sometimes observed to be cooling and sometimes they were warming, with a given methodology. Clearly, Cook endorses the methodology to eagerly look for possible errors with the sensors whenever an observation is inconsistent with his beliefs. What can I do with that? A proper scientific analysis of such things requires one to be equally active when searching for possible errors in both directions. Cook shows that he is incapable to sustain this impartiality - and it seems likely that the authors he cites suffer from the same problem.
30. **We're coming from the Little Ice Age:** He agrees we have been, until 1940, when the natural factors reverted and could no longer explain the changes. This is a sloppy analysis: first, there was indeed a 30-year period of cooling after the 1940s; second, the number of large volcano eruptions recently dropped, and because the eruptions have a cooling effect, their shortage implies an extra warming; it's also untrue that the solar activity was recently lower than in half a century ago. The relatively recent cycles were strong and the decline is a very recent fact of the latest solar cycle. The added statement about the CO2 driving the changes since 1970 is unsupported. Moreover, note that the greenhouse emissions didn't start in 1970. They were almost the same in the 1960s, too. But because there was no warming in that decade, Cook tries to hide those emissions. All these "small tricks" and "distortions" belong to his propaganda toolkit, and when combined, they're obviously enough to completely mislead the reader (and himself).
31. **It cooled mid-century:** He claims that the natural forcings worked until 1975 when the greenhouse effect began. That's, once again, ludicrous. The 1940-1975 cooling is unexplained by any well-known forcings, and the idea that people could explain it remains a speculation and a wishful thinking. There's no reliable, justified, testable, yet viable model here, and the problems of the models to agree with the 1910-1945,

1940-1975, or 1975-2010 periods are comparably difficult. Of course, sometimes, the models are fine-tuned to reproduce one of the intervals "roughly correctly", but then the other intervals fail. There is no asymmetry between the periods here and the cooling around the 1950s is an argument against the importance of the CO2 greenhouse effect - much like the recent cooling since 1998. It's just inconvenient but it's the same kind of an argument that the AGW advocates are using all the time whenever these arguments suit them. In a discipline where many arguments are 2-sigma if not 1-sigma signals, such a bias is lethal.

32. **Climate sensitivity is low:** That's a typical headline of some of my talks. Cook says that it's 3 °C because of many reasons. The fact is that the direct calculation gives 1.2 °C and all balanced analyses of the Earth's history, including very old geological data, suggest that this is about right, i.e. the net feedbacks are small, with an unknown sign. All papers or claims going to 3 °C or higher are fabricated and cherry-pick something to "hype" this number that almost certainly can't reach 3 °C. The promoted positive feedbacks may be viewed as a quantification of the hype, exaggeration, and fraud: 70 percent of the IPCC figure for the climate sensitivity is fabricated because a higher value is favored by the "big picture" of the political process.
33. **It warmed before the 1940s when CO2 emissions were low:** Cook says it was because of solar and volcanic drivers which disappeared later. But this is a pure speculation because those drivers are very hard to quantify - especially in the era 50-100 years ago. Cook only cites two papers and they really don't agree with each other. There are many other papers but there's no clear picture about the important drivers responsible for the 1900-1940 warming. We should avoid the "illusion of knowledge" here.
34. **There's no empirical evidence:** Cook offers what he considers the key empirical evidence: CO2 is measured to rise; satellites show that it blocks some IR rays; oceans are apparently collecting heat. This gives a "line" of evidence, he thinks. Well, there's no doubt that we're adding CO2 to the atmosphere. But whether it matters depends on a "line" of hypotheses and several of them are only supported by a very poor evidence. The chain is only as strong as its weakest link: it's a point that Cook and others completely misunderstand. He apparently thinks that the more convoluted chain of arguments he constructs, the more likely it will become - and one vague evidence for each link is enough. However, the truth is the opposite one: the longer the chain of the relationships whose importance should be high is, the less reliable the chain becomes, and the more evidence we need for every individual link. The empirical evidence that CO2 is actually blocking the escaping IR radiation is extremely poor and the estimates of the heat accumulated by the ocean - and similar quantities - is often being changed by 100% or so. We don't really know the sign with any degree of confidence that would be worth talking about. To summarize the situation, there's no empirical evidence that CO2 actually affects the climate, and we only have theoretical reasons to think that it should have **some** effect - but we also know dozens of other things that should have an effect.
35. **Mt Kilimanjaro's ice loss is due to land use:** Cook agrees that it's not due to global warming only - but misrepresents the main causes. The main causes are due to changes of precipitation patterns that don't necessarily depend on "land use". He

correctly says that the observation about the unimportance of global warming for Mt Kilimanjaro doesn't mean that the "globe isn't warming". But he fails to say that it doesn't mean that the "globe is warming", either. Similar episodic evidence is often used to support the AGW orthodoxy but whenever it's shown that the arguments don't work, such findings are being ignored by the AGW proponents. Honest scientists simply can't ignore the inconvenient findings, so because Mt Kilimanjaro's ice loss has been used as an argument supporting AGW, and because this argument has been shown to be wrong, it's obvious that it has become an argument against AGW.

36. **CO2 effect is weak:** this is clearly the same point as 31 about climate sensitivity, and others. It doesn't even seem that John Cook realizes it's the same thing. Again, he claims that this CO2 effect is directly measured by energy flows. Lindzen and Choi recently showed that the energy flows, on the contrary, prove that the large positive feedbacks attributed to H2O etc. can't exist. But whatever the primary driver is, it hasn't been empirically determined what it is.
37. **Glaciers are growing:** I agree that there are glaciers that are growing and I agree that most glaciers - if counted as "individuals" - were retreating in the last 50 years or so. I don't think that the statement that the retreat is "accelerating" is supported by anything else than a wishful thinking. It's a part of a whole fog of unsubstantiated guesses, speculations, and lies that have become a part of the standard alarmist talking points because they no longer think it is wrong to produce downright lies. The recent GlacierGate scandal - and the Indian alternative studies about the Himalayan glaciers - are just one major example showing that most of the widely spread statements about the "accelerating retreat" of the glaciers are simply lies unsupported by anything
38. **Polar bear numbers are increasing:** He says that the polar bears have to die because there will be no ice which means that there will be no seals which means that the bears can't eat anything. This is a three-story argument and each part of it is highly disputable, to say the least. First of all, it's very unlikely that the sea ice will completely disappear in any foreseeable future: also, the polar bears don't live just on sea ice but also on islands of Northern Canada etc. Also, it's untrue that the seals themselves are endangered, and it's untrue that the bears can only hunt for them in the middle of the sea. In most cases, it's actually not the case. So Cook's evidence that bears should face problems is extremely shaky - especially relatively to the direct observation of the final result which says that the polar bear population has increased by a factor of 5 in recent decades, from 5,000 to 25,000 or so.
39. **Extreme weather isn't caused by global warming:** in Cook's view, there is "growing empirical evidence" that intense hurricanes, heavier rainfall etc. are here and caused by global warming. This is a two-story argument. One wrong floor would be enough for the argument to die. However, both of the steps are actually wrong. First, even if these "extreme events" would be growing, there's absolutely no reason to think that it's caused by rising global temperatures: the case of hurricanes was discussed previously. Second, the intensity and frequency of "extreme events" is actually not increasing at all, so there's nothing to explain here.
40. **IPCC does not represent consensus:** Cook says that the IPCC guys are leaders and that the reports are too conservative. That's, of course, nonsense in both cases. First, the IPCC is being elected by the governments - because it's an "inter-governmental

panel" on climate change - e.g. by politicians whose vast majority has no idea about science, and not even about the question who is a good scientist and who is not. They're clearly choosing scientists according to their willingness and likelihood to produce the predetermined conclusions. Concerning the "conservative IPCC reports", it's a preposterous statement because every single problem that has been found about the IPCC report as of today was in the direction that the IPCC was more hysterical than what the science says - it was never in the other way around. Cook's statement is a downright lie.

41. **Satellites show no warming in the troposphere:** He agrees but claims it's an error, due to "satellite drift". Well, again, inconvenient observations have to be doubly attacked, questioned, and an error has to be found. It's a biased treatment. The fact is that the tropical troposphere should show, if the greenhouse model of warming is correct, the fastest warming trend. In reality, it shows one of the slowest trends and it's very likely that the right interpretation is that this observation by itself rules out the greenhouse model of the recent warming. It's surely inconvenient for fanatical believers but this emotional fact doesn't make this argument less convincing from a scientific viewpoint.
42. **CO2 is not a pollutant:** Cook agrees that it's not a pollutant and global warming (and ocean acidification) are the two impacts. But changes of the temperature are mostly not caused by CO2, and even if they were, they're small and harmless. Ocean acidification is at most by 0.2 in several centuries - from 8.1 in the past to 7.9 in the future. That's a negligible change relatively to the intervals that the life in the oceans tolerate. Recall that aquarium fish can live in pH between 5 and 9.
43. **There's no correlation between CO2 and temperature:** He agrees it's been recently absent but says it was due to El Nino and La Nino episodes. Indeed, they're a major part of the answer because they're much more important for the temperature than CO2. But even El Nino and La Ninas are far from being the only natural factors that matter. Still, these phenomena exist and it's just wrong to imagine that there is no natural variability of this sort in the climate. Because CO2 and temperature have been largely uncorrelated in the last 50 years, they will probably remain largely uncorrelated in the next 50 years, too. And it's just irrational to imagine that small changes to the CO2 concentration will have a direct impact on the temperature. They have small enough of an impact for them not to matter.
44. **Climategate CRU e-mails suggest conspiracy:** According to Cook, it's just a distraction to look at these e-mails. In reality, these e-mails not only "suggest" conspiracy but they "prove" that the key authors have conspired to hide or erase or suppress inconvenient evidence, either obtained by their own methods or obtained by others. While "conspiracy" should be an unlikely event, the Internet has surely made it possible - and easy - for a group of a dozen of researchers to synchronize their behavior in order to distort the conclusions of their discipline in a particular direction. As the CRU documents show, it has affected every single major source of evidence supporting the AGW line of reasoning, especially the reconstructions and the question whether the recent changes were new in any sense, as well as the verification of climate models which was not done properly.
45. **Scientists can't predict weather:** And Cook says it doesn't matter because the chaos averages out. Except that e.g. in the recent Self-similarity of temperature

graphs TRF article, I demonstrated that the chaotic character of the temperature changes survives from weeks to centuries or millennia. The signal-to-noise ratio remains pretty much constant even at longer timescales, and certainly decades. The actual empirical evidence shows that decades are still way too short for us to be able to "average the chaos out". After all, decades are the time scale of the Pacific Decadal Oscillation and many other chaotic cycles affecting the oceans and the atmosphere. Cook's claim is wrong.

46. **CO2 levels were higher in the past:** Cook claims that whenever the CO2 levels were higher, the solar output was lower. This is preposterous. There is no easy inverse correlation between the Sun and the CO2. When the concentrations were 10,000 ppm, more than 25 times higher than today, the solar output was often close to the present one. Nevertheless, the temperatures were similar to the present ones up to a few degrees of difference. This fact by itself shows that CO2 can't have a big effect on the temperature.
47. **Greenland is gaining ice:** He claims that while the bulk of the Greenland is growing, the coastlines are losing ice, which is right. The overall volume is likely to be decreasing in recent years, indeed. And maybe not: the errors of these measurements are way too high. However, his usual statements about an "acceleration" are just a silly cherry-picking of bumps. The "accelerating" effect in his graph is barely visible and there are hundreds of similar patterns that would suggest "deceleration" but the likes of Cook simply ignore them because such a deceleration is not useful for them. To summarize, there's no statistically significant and attributable acceleration - that would go beyond "chance" - in the data. In fact, we know that the overall melting of ice on the Earth has surely decelerated dramatically a few thousands of years ago.
48. **Neptune is warming:** It's because of summer coming on Neptune, Cook argues. Well, maybe, and maybe not. Cook uses some bizarre "Heidi" paper and on the detailed page, Dr Foukal debunks this bizarre paper.
49. **Jupiter is warming:** it's due to internal turbulence, he says. Note that Cooks like oversimplified slogans that give you one reason for everything - one sentence you should memorize - and the explanations are always different. He's always satisfied with the first guess as long as it is consistent with the basic AGW religion. That's not how science works. Clearly, all the effects on Neptune may matter on Jupiter, too. And vice versa. The vastly different character of the explanations shows that these changes of the planetary temperatures haven't been understood reliably. Papertiger and others have interesting complaints about the "internal" explanations for the Jupiter. Of course, the main and only important goal of Mr Cook is to "kill" all solar or cosmic explanations because they're inconvenient. But they can be true and it remains to be seen whether they matter. Preconceptions of AGW bigots will play no role as science selects the relevant arguments.
50. **There's no tropospheric hot spot:** this has been discussed in the point 40. Cook says that it has to be due to measurement errors. Probably not. It's just true that the measurements he's trying to attack are, despite their errors, still much more reliable than other measurements that Cook wants to rely upon. This selection of which evidence should be trusted and which evidence should be considered erroneous only reflects his bias, not any rational arguments.

51. **Pluto is warming:** coming summer, too, like with Neptune in 47. Again, may be right, may be wrong. There's no detailed evidence over there.
52. **It's the Pacific Decadal Oscillation:** his argument that it's not the case is that the last time PDO switched to a cool phase, the temperatures were 0.4 deg Celsius lower than today. But most of the time since that switch belonged to a PDO warm phase in which the temperatures are generally increasing (and keep on increasing). So his argument doesn't disprove anything. He has confused a function from its derivative.
53. **Greenland ice sheet won't collapse:** Cook sees everything accelerating and refers to the sea ice levels. However, the change of the sea ice level is very slow, and in agreement with the pre-industrial natural rates, so there's nothing qualitative here to discuss. The Greenland has been discussed in 46, too.
54. **CO2 effect is saturated:** He claims that energy flows show it is not. Well, there is no proof via energy flows that it is not saturated, but it is true that it is not saturated. However, the effect is slowing down with the concentration. The same relative increase causes the same temperature change. So when the concentration was 200 ppm, a 1 ppm increase caused the same warming as a 2 ppm increase today when the concentration approaches 400 ppm. This slowdown is very important. Effectively, it means that even if the concentration of CO2 were rising exponentially, the greenhouse warming caused by CO2 would be linear. That's because the exponential is inverse to the logarithm. ;-) This slowdown is just another example of the inherent stability of the processes in Nature - a negative feedback.
55. **It's the ocean:** He says that "oceans have been warming" which completely misses the point of the sentence "it's the ocean". The sentence "it's the ocean" clearly meant that the internal dynamics of the oceans, similar to the turbulent dynamics that he believes to be responsible for climate change on Jupiter in point 48, is responsible for the changes of the Earth. He has given us no counter-argument against this point whatsoever.
56. **Volcanoes emit more CO2 than humans:** It's a favorite misconception of some skeptics, and I agree it's a misconception (it appeared on the Great Global Warming Swindle, too). Volcanoes are just like a "few natural factories" and correspondingly, they emit roughly 100 times less CO2 than the people. On the other hand, they've been doing it for billions of years, so it's still true that most of the CO2 in the atmosphere came from similar natural processes, and not from industrial CO2 emissions which are very recent and will only last at most for a few more centuries.
57. **CO2 measurements are suspect:** Well, indeed, the CO2 can be measured to be rising, but many people still misunderstand the high fluctuations of CO2 in various environments. The concentrations of CO2 in various places of the forest and/or in various rooms of your building differ by hundreds of ppm from each other. It's completely normal and causes no problems.
58. **Animals and plants can adapt:** Cook says that many extinctions were largely caused by CO2. That doesn't agree with the scientific literature. Almost no theories of extinctions caused by CO2 remain alive in the scientific literature: much more convincing reasons have been found. Cook says that organisms can't adapt because the change is too fast. That's bullshit. It's not fast but even if they were fast, the organisms that live today are genetically capable to live in temperatures that differ by a dozen of degrees from the existing one. That's because their genetic material hasn't

changed much for millions of years - evolution is very slow - and during the millions of years, the temperature has surely changed by dozens of degrees, anyway. So the changes pose no problem for the "inherent" abilities of animals and plants to withstand it. Moreover, there are trivial ways to adapt - move to a different latitude, altitude, and/or move the seasonal cycle closer to the winter - or a combination of these things. We can observe that no species are actually being threatened - or going extinct - by the climate change, too - and pretty much all opposite statements ever made have been proved wrong.

59. **Less than 1/2 of papers support global warming:** Cook agrees that most or one-half of papers don't express any opinion about the AGW orthodoxy. Cook interprets it by saying that it's because the authors think that the orthodoxy is "obviously true" and they want to discuss "more advanced" things such as mitigation. That's a ludicrous wishful thinking. One can also conjecture that these papers don't say anything because the authors assume that it's obvious that AGW is crap - and they want to discuss something more sensible instead.
60. **It's aerosols:** Cook suggests some incomprehensible problem with the timing in 1975 and 1990. Whatever the problem is exactly supposed to mean, it's clear that any of the IPCC and related models using aerosols to "handwave away" the cooling in 1940-1975 suffer from the same timing problem, but with a much longer duration and much larger amplitude. Aerosols remain an unknown and no models with them work reliably. Cook can try to obscure this fact but he can't obscure it. It even remains plausible that a changing amount or character of the aerosols is responsible for most of the climate changes in the 20th century. There's no available method to disprove this conjecture today.
61. **It's El Nino:** Cook says that it can only explain the short-term changes but not the decadal ones. But he fails to notice that the frequency of El Ninos, relatively to La Ninas, has been higher during the recent "warming" decades. Again, it's completely plausible that most of the centennial changes are about the accumulated heat from the El Nino or La Nina episode whose representation is never quite dictated by "gender quotas" (recall that the words mean "boy" and "girl" in Spanish). Also, the relative frequency of El Nino and La Nina episodes may be affected by additional, slower cycles such as Pacific Decadal Oscillation. To summarize, there's no reason to call 30 years a "long term" when it comes to implications of ENSO cycles.
62. **It's a climate regime shift:** A 2009 paper by Tsonis and Swanson was claimed to explain the warming as a qualitative switch to a different mode of the climate which is surely a priori plausible. However, Cook argues that he can divide the temperature into "internal" and "externally driven", proving that the latter is inherently increasing. However, the amount of "linear trend" included in various "regimes" is completely arbitrary, essentially assuming that the average "internal trend" was zero (without any justification), so he can't possibly prove that the internal regimes in the 20th century contributed no "trend-like" warming. The "separation" is impossible in general - and Tsonis and Swanson only got such a separation by "construction". The difference only looks monotonic because it was smoothed in this way - the internal effects were defined so that they can remove the biggest wiggles. Cook applies a flawed circular reasoning if he claims that the monotonicity of the difference actually implies that the "other (CO2-driven?) warming" was monotonic. It wasn't. The

monotonicity was only improved by construction - by trying to subtract the wiggles - but such an operation can be done with noise and random possible signals, too. To summarize, Cook hasn't demonstrated that the regime shifts can't account for the "trends". I don't claim that it's inevitably so but I do claim that his "proof" is flawed.

63. **It's microsite influences:** barbecue devices etc. often sit in the stations and Cook says that it doesn't matter. In reality, a huge portion of the surface stations was affected by such things and the accumulated errors often exceed 1 degree Celsius. A priori, the effect of the microsite influences may be both warming and cooling. In reality, because of the increasing energy (and heat) used by humans, the actual impact of the microsite influences almost always overstates the warming trend. But I do think that the paper that Cook cites is realistic, assuming that it didn't use some wrong adjustments along the way, and the microsite effects could actually be as small as the picture indicates.
64. **Humans are too insignificant to affect global climate:** I agree with him that this is too sloppy an argument. However, Cook mentions one or two numbers - 26 gigatons of CO₂ emitted per year. Humans are dramatically changing the composition of our "climate", he said. He probably meant the "atmosphere", not the "climate", because "composition of climate" really does sound silly. However, whether 26 gigatons is a lot or not has to be judged relatively to the atmosphere. It's just 1-2 parts per million of the atmosphere - one or two millionth. So the mass may look large relatively to your lunch but it is negligible relatively to the atmosphere. And don't forget that even the whole atmosphere is just 1 part per million of the mass of the Earth! Humans are not changing the composition of the atmosphere in a substantial way. They're just changing a trace gas - CO₂ - that is very important for life to exist and that is importantly linked to the key industrial processes. Carbon dioxide is vastly less important for the climate than it is important for life and industrial processes.
65. **It's land use:** Cook says that these effects are small etc. However, the changes to the albedo obviously induce temperature changes that reach tenths of a degree or degrees per century, too. There are additional effects - sewer systems reduce evaporation over cities and modify the wind patterns, humidity, precipitation, water vapor greenhouse effect, and many other things. It's very unreasonable to keep CO₂ greenhouse effect and dismiss all these "land-use" effects because the latter are almost certainly comparable in their influence on temperatures.
66. **Medieval Warm Period was warmer:** Cook says that only locally - globally, it was cooler, he argues. However, the "reconstructions" he offers are linked to the discredited hockey-stick studies (and especially the discredited people behind them). The best evidence is actually historical in origin, from the traditional civilized places, and it does suggest that the period was warmer than the present. It's unlikely that the whole world was "much cooler" than expected from these temperatures. But even if it were so, the temperature e.g. in England was (and is) more important for the Englishmen than the global mean temperature. Finally, in a recent BBC interview, top alarmist and hockey-stick advocate Phil Jones admitted that the MWP was warmer than the present on the whole Northern Hemisphere and he only speculatively suggests, with no real evidence, that it could have been different on the Southern Hemisphere. Even if the MWP were only warmer on the Northern Hemisphere, it

would still make the claims that the present is "unprecedentedly warm" very awkward.

67. **It's methane:** I agree with Cook that - regardless of the unknown feedbacks - methane contributes roughly 1/3 of the greenhouse effect of CO₂. Whether it's negligible depends on your calculations. Clearly, methane is less clearly correlated with the industrial things that the environmentalist movement wants to reduce - so it's not interesting enough for them. But a 30% error in some calculation is pretty high. Methane adds more greenhouse effect than e.g. all the transportation on the Earth, and methane probably has a bigger potential to change than the CO₂ emissions from transportation. Only complete calculations can settle such things - and calculations based on the assumption that everything but CO₂ can be ignored are definitely wrong.
68. **IPCC were wrong about Himalayan glaciers:** While Cook agrees that the year 2035 was wrong and unfortunate, he insists that they're retreating at an "accelerated" rate. That's not what the Indian report that studied the question found. Many of them are advancing and the general rate of their retreat hasn't accelerated. It's clear that even under the business-as-usual, the glaciers can't disappear in less than 300 - and probably 1,000 - years and some advocates of the climate panic are deliberately trying to hide this fact. Moreover, the error wasn't just a typo. It's just one among hundreds of examples in which the IPCC is trying to exaggerate the hypothetical problems and invent fake stories. Every single IPCC error that's been admitted was about the IPCC's attempts to exaggerate the hypothetical threat. It's no coincidence: this exaggeration and fabrication is the reason for the IPCC's very existence. And it has always been.
69. **500 scientists refute the consensus:** Cook says that they don't, and if they do, they just repeat "myths". Well, he can try to label them "myths" which doesn't change the fact that they often confirm and substantiate textbook material on the climate that every serious researcher in the discipline should be familiar with. See e.g. these hundreds of peer-reviewed articles or 31,000 scientists who disagree with the AGW orthodoxy, including 9,000 with PhD degrees.
70. **Solar Cycle length proves it's the Sun:** Cook says it's been "settled" in recent years that the Sun couldn't have contributed to the changes since 1975. And I would agree if he said that one or two previously "suggestive" correlations have broken down once new data were included. However, the changes since 1975 contain a lot of chaotic weather events. It's still true and important that the Sun does matter for climate change - over centuries etc. Nothing has changed about the geological evidence linking the solar activity, cosmic rays, and the temperature on the Earth. Nothing has changed about the correlations between Maunder and Dalton minima on one side and the little ice age on the other side.
71. **The science isn't settled:** Cook correctly says that science is never "quite" settled and different statements are known at different confidence levels. However, many of the key statements surrounding CO₂ and climate are only claimed to be known at the 90% confidence level which is really just an euphemism for a 50% confidence level because a tiny amount of cherry-picking and distortion is enough to make 50% results look like 90% results. At any rate, the man-made climate change science isn't anywhere close to the conventional disciplines of hard science. And judging from the fact that the proponents of AGW are scared of the 5-sigma standards that are normal

in proper scientific disciplines, it seems that they realize that all their "signals" will go away when a bigger amount of evidence is taken into account. If the "signals" for AGW were real, it would be straightforward to extend them to 5-sigma discoveries which has never happened - and it seems likely that it will never happen.

72. **Phil Jones says no global warming since 1995:** Cook correctly says that the claim was about no "statistically significant warming" since 1995 but he obviously misunderstands what it means. He says that it shows our "inability to find a signal" over a short period. However, the period since 1995 is not short. It is comparable to the timescale where the "climate" often begins according to many people. In a period that is as long as 15 years, the global warming not only fails to be serious: it fails to be detectable with the most accurate gadgets and the most accurate statistical techniques to average over the globe that we have. Because a warming can clearly only become "dangerous" when it is much higher than the temperature differences we can actually detect, it follows that even if the observed warming were man-made, we will need at least a century for it to become "threatening", and claims that we must urgently change our civilization in this year or in the next year are unjustifiable.
73. **Hansen's 1988 prediction was wrong:** Cook is trying to defend the indefensible. He says that the actual emissions followed Hansen's scenario B and so did the temperature. In reality, the actual emissions clearly followed Hansen's scenario A - business as usual - for which Hansen predicted a warming that was roughly 3-times faster than the actual one that has occurred since that time. If the initial points of the graph are merged according to the proper rules, we may actually see that the warming that has occurred since Hansen's 1988 testimony was even lower than in his scenario C, e.g. a nearly complete and sudden stop of the industrial activity. Hansen's predictions were spectacularly wrong.
74. **Naomi Oreskes' study on consensus was flawed:** Cook says that all criticism has been retracted - and he only knows about the criticism by Benny Peiser (whose name is misspelled by Cook). In reality, Peiser only retracted his own version of the Oreskes paper because there were (finer) errors in his version of the analysis. But the very fact that Oreskes' paper has been completely wrong is indisputable. For example, point 68 above discussed and linked to hundreds of peer-reviewed papers that have contradicted the "consensus" and that were completely missed by Oreskes' flawed methodology. More precisely, some of them were published after Oreskes' paper - a moment when the meltdown of what Oreskes called the "consensus" has rapidly accelerated - but the main message for the present era remains: it's just a straight denial to claim that there are no peer-reviewed papers contradicting the "consensus". There are hundreds of them. They're surely inconvenient for Ms Oreskes or Mr Cook but sadly for them, that doesn't make them "unreal".
75. **Record snowfall disproves global warming:** Cook actually says that record snowfall pretty much proves global warming. The champions of climate panic have always loved to interpret individual weather events as "proofs" of global warming and the likes of Mr Cook do so even when it is completely irrational. See Global warming causes snowstorm in D.C. for some explanations why global warming can't possibly have this effect. If the annual mean temperatures increased by 1.5 °C per century or so, places like Prague would see almost no difference. However, the reduced amount of snow would actually be the most visible difference. The total amount of snow cover

in a year would drop by something like 25%. The percentage of snow-covered days is proportional to the percentage of days whose average temperature is below the freezing point. The latter would clearly decrease a bit in a warmer climate - but not enough to cause any real problems or qualitative changes. Also, global warming reduces the polar-tropic temperature differences which should reduce the storminess, driven by the gradients, and make the "extremely large" storms of all kinds less frequent. The opposite claims are scientifically unjustifiable - they're only being said because the proponents of climate panic like to spread fears and bigger storms are "worse" than smaller storms. They rely on the assumption that no one will ever check what they say - and everything they say in this respect is scientifically invalid.

76. **Sea level rise predictions are exaggerated:** *Cook clearly doesn't like the IPCC mean value, which is 43 centimeters per century, so he even doesn't offer the figure. Instead, he speculates that the accelerating melting in Greenland and Antarctica may increase the figure to 75-200 centimeters per century: he claims that the IPCC doesn't include this contribution. However, it's not really possible for ice to "suddenly" increase its rate of melting by an order of magnitude. Such a "regime shift" is not supported by any serious work - except for a wishful thinking by Mr Hansen and a movie by Al Gore. While the 43 centimeters per century in the IPCC report is unspectacular, the truly realistic estimates such as those by Nils-Axel Mörner, probably the world's #1 expert in this discipline, predict something like 0-20 centimeters of sea level rise per century.*
77. **The Sun is getting hotter:** *I agree with Cook that the Sun's output has been decreasing since 1978 - but once again, I disagree that the total radiated energy is the only parameter that determines the Sun's influence on the Earth's climate. But I would agree that there exists no immediately convincing theory that would link the temperature changes of the last 30 or 50 years to the solar parameters.*
78. **Water level correlates with sunspots:** *It's just another variation of the methods to test the correlation between the solar activity and the climate on Earth. I agree that the agreement in this particular correlation has been unimpressive since the 1970s, but so was the correlation between CO₂ and temperature. Clearly, a full theory of the climate is more complex than either, and chaotic, largely unpredictable dynamics is likely to play a key role here.*
79. **Solar cycles cause global warming:** *I agree with Cook that the 11-year cycles don't give any useful contribution that could modify our estimates of the CO₂ climate sensitivity. He discusses Tung 2008 but it is probably unnecessary. 22-year cycles may be more important but the case is not too strong, either. However, the slower cycles - that led to Maunder and Dalton minima etc. - are more likely to have an influence on the climate and the correlations continue to work. It's not nice that Cook is trying to pretend that by his discussion of Tung 2008, he "debunks" the influence of all solar variations. He surely doesn't.*
80. **CO₂ is coming from the ocean:** *I agree it's not, not only because of the isotopic composition. However, if the warming were substantial, we know - from the ice-age cycles - that the oceans will release something like 100 ppm per 6 °C of warming. It takes some time for the oceans to heat up and for the outgassing to operate.*
81. **It's not us:** *This is a surprisingly basic and general point to appear on the 80th place. As "proofs" that it's us, Cook mentions satellite-measured energy flows and the*

stratosphere cooling. However, the latter is a general by-product of any near-surface warming, so it says nothing whatsoever about "us". To see whether the warming is due to the greenhouse effect, we need to look at more specific "fingerprints" of the greenhouse effect, namely the warming in the tropical mid troposphere where the greenhouse theory predicts the fastest warming trend. And according to the observations, it doesn't work at all: when the relevant criteria of the type Cook mentions are used correctly, science clearly says that it's not us. The energy flows disagree between the observations and the greenhouse-dominated models, too: see Lindzen Choi 2009. Again, it's not us. Cook's arguments are complete bogus.

82. **Over 31,000 signed the OISM Petition Project:** Well, I don't like these "body counts". But Cook says that the number is just 0.3% of science graduates - probably right - and the list only contains 39 scientists who are climate science specialists. That's nice but the 2500 people in the IPCC only represent 0.03% of science graduates, the percentage of climate scientists who actually matter in the institution is also low - relatively to e.g. railway engineers and NGO activists. And yes, it's true that the bulk of the climate scientists have been bought to spread the panic: 90% of the current funding for climate science is spent for the fabrication of fake evidence supporting the alarm (just compare the funding levels before the AGW became the most popular question of the climate science with the current funding which is 10 times higher). So indeed, I am not going to dispute Cook's assertion that most of the people who are paid to promote AGW do their job: the discipline is corrupt.
83. **2009-2010 winter saw cold spells:** I agree with him that it's primarily due to the strong phase of the Arctic Oscillation and doesn't immediately influence the global mean temperature. On the other hand, such events are often more important than the changes of the global mean temperature. While Cook correctly says that the Arctic Oscillation and similar events are different from the changes of the global mean temperature, he doesn't correctly deduce which of them is more important. The cold spells of the 2009-2010 winter were clearly more important e.g. than an estimated "underlying" 0.01 °C increase of the global mean temperature from the previous winter. So the focus on the global mean temperature is a focus on one of the least important things about the climate.
84. **Ice isn't melting:** Ice has been largely melting for several centuries, since the bottom of the little ice age, and sometimes it was accelerating and sometimes it was decelerating. At longer time scales, such changes have alternated many times. However, Cook always says that every melting is "accelerating" - he repeats this adjective about five times just in this point. The actual data he uses to argue for such "acceleration" clearly have too much noise for the acceleration to be statistically significant. So he's simply comparing trends in various intervals, and if they're accelerating, he celebrates them. If they're not (e.g. his final graphs), he hides the fact. The resulting picture says nothing else than his whole "research" is composed of cherry-picking. Ice has been largely melting for a few centuries - with some glaciers etc. advancing but most of them retreating - but what the causes have been and whether the process will continue or will revert is yet to be seen. Clearly, not all (or most) changes of the ice volume since 1800 can be explained by the industrial activity.
85. **Mike's Nature trick to "hide the decline":** Cook correctly says that the trick was to

merge the tree-reconstructed noisy data from the past with the instrumental record in recent decades. Because the trees' dynamics looks much more muted, the reconstructed temperatures in the distant past look much less variable than the actual temperatures measured by the thermometers. So the recent changes are artificially magnified by the trick is merging the two sources. In fact, as Cook realizes, it's worse than that: since 1960, the trees would imply that it's been cooling! It's the so-called "divergence problem" that makes the whole methodology based on tree rings highly suspect, to say the least. Cook's bizarre claim is that the effect causing the "divergence problem" only affects the reconstructions after 1960. That's just like saying that until 1960, the Earth was flat but it became round after 1960. Laws of physics can't suddenly change in this way. Whatever is causing the divergence problem may have also invalidated - and probably invalidates - the trees' testimony about the temperatures in the Middle Ages, too.

86. **Climate is chaotic and cannot be predicted:** He realizes that the chaotic behavior is there but just like most alarmists, Cook believes that the chaos goes away if you look at changes in a few decades. Well, it doesn't. The chaotic, pink-noise-like changes of the temperature extend to timescales as long as millennia: see Self-similarity of temperature graphs. So it's actually conceivable that most changes that we can see at any time scale between hours and millennia are changes of a chaotic character and therefore largely unpredictable. The problem here is that 30 years or so "looks long" relatively to the human life. But the human life has nothing to do with the climate. When we look what are the timescales at which the pink noise really starts to be regulated by negative feedbacks etc., we find that it is probably longer than a millennium.
87. **It's albedo:** Cook claims that the long-term change of the albedo - reflectivity of the Earth's surface, roughly speaking - would imply cooling (because the Earth was getting increasingly reflective, he thinks) but there's no "recent trend". This is a very problematic assertion by itself. Again, what is meant by the "long-term changes"? Clearly, whatever the trend is, it couldn't have been going on indefinitely because the albedo always has to belong to the obvious interval, between 0 and 1. Even more importantly, Cook contradicts himself. He claims that the albedo was increasing - the Earth was going more reflective in the long run (which would imply cooling). However, the ice-albedo feedback is a major feedback that should amplify the warming: the darker surface you have, the more energy it absorbs, the warmer it gets, and the more ice/snow melts. Cook can't have it both ways! Clearly, he would like the albedo - as a separate reason of the warming - to be going up so that it would add a cooling effect in the past, thus leaving more warming to CO₂. On the other hand, he would love the albedo to go down in the future as a side-effect of the CO₂-induced warming, to amplify the warming. He not only creates arguments that would "explain" predetermined conclusions - but his arguments actually contradict each other directly.
88. **CO₂ is not the only driver of the climate:** But according to Cook, it's the dominant one and is increasingly faster than any other radiative forcing. The first comment is clearly nonsensical: the CO₂'s radiative forcing is just 3.7 W/m² per doubling (and there has been less than one since the pre-industrial era) while the clouds themselves remove about 30 W/m². This is about an order of magnitude higher than the CO₂ forcing - and there are many similar forcings that are comparable to

the clouds, of course. After all, they have to add up to 235 W/m^2 that the Earth thermally radiates. But even when we look at changes, it is not true that the change linked to CO₂ is the fastest change. We need roughly 200 years for a CO₂ doubling, so it is 0.5% of doubling per year, or 0.005 times $3.7 = 0.02 \text{ W/m}^2$ change per year. Virtually any other known climate driver is faster than this! This fact remains to be true for all major drivers at the timescale of 10 or 20 or 30 years. After all, that's why it's so easy for the climate to show no warming for 10 or 15 years. Whether a CO₂-induced warming becomes "inevitable" after 50 years depends on whether or not the other drivers have to average to zero at this time scale - which is far from obvious, to say the least.

89. **IPCC were wrong about the Amazon forest:** And Mr Cook thinks it wasn't. Of course that it was completely wrong. For example, a 2007 paper by NASA studied the impact of the unusually strong 2005 drought on the region. The forests not only showed to be resilient but the drier regions of the tropical forest actually got greener! It's no contradiction because the region could actually be receiving higher-than-optimal precipitation on a typical year. Also, it should not be shocking that the IPCC wrote invalid statements about it because it was building upon a green advocacy group's ideological booklet rather than science. Unfortunately, such things became common with the IPCC and the climate community in general: it may be fair to say that the bulk of the climate science community has become an advocacy group rather than an impartial scientific institution.
90. **Water vapor in the stratosphere stopped global warming:** Susan Solomon 2010 realized (or "discovered the wheel") that H₂O in the stratosphere is an important climate driver. It seems that it has acted as a negative feedback, compensating for the warming caused by other factors (maybe including CO₂). Cook argues that "long-term warming trend" suggests that such a negative feedback can't exist. I can't possibly understand the logic of his argument. His argument seems to be "one number, a 100-year warming, is positive, which is enough to rule out all inconvenient statements, theories, and observations." Well, it's surely not enough. There's been no warming e.g. since 1998 and although the reasons behind this fact may look chaotic because it could have been both warming or cooling (or none), science may still try to explain the detailed reasons. Solomon showed that a particular effect was nonzero and proposed it mattered for the changes since 1998 (among other things). As far as I can see, Cook has offered no rational counter-evidence whatsoever.
91. **Scientists retracted claim that sea levels are rising:** Cook correctly says that the critics who made these authors retract the paper actually wanted to increase, not decrease, the predicted figure. After all, the main critic of the paper was Stefan Rahmstorf of RealClimate.ORG, a Gentleman who is trying to push all numbers in the discipline in one particular direction all the time. However, it's still true that the authors have retracted the paper. Point 75 discusses more reasonable estimates of the sea level rise.
92. **CO₂ is not increasing:** I agree with Cook it has been increasing: the 12-month running averages were increasing almost exactly linearly (unlike the temperature which is chaotic). About 40% of the newly emitted CO₂ remains in the atmosphere today. It's likely that this percentage will increase because more properly, we shouldn't count the absorbed CO₂ as a percentage of the emissions but as a

percentage of the excess CO₂ that is already in the atmosphere. Every year, we emit the equivalent of 5-6 ppm or so but the CO₂ concentration only increases by 2 ppm or so. Clearly, the Earth has to absorb the remaining 3-4 ppm every year. It's absorbing this amount of CO₂ because the CO₂ concentration is elevated and the processes that absorb it beat those that emit CO₂. However, this amount absorbed by Nature will get even bigger if the deviation from 280 ppm - the temperature-dependent equilibrium value - gets larger. For example, if the CO₂ concentration reaches 560 ppm, the Earth may absorb 10 ppm a year which may exceed our emissions in 2100 when the concentration may reach 560 ppm. The CO₂ concentrations may stabilize or start to drop at that point. If we stopped emitting CO₂ completely, the concentrations would begin to drop by 3-4 ppm per year.

93. **Mauna Loa is a volcano:** I agree with Cook that the specific features of Mauna Loa don't invalidate its measurements of CO₂.
94. **CO₂ was higher in the late Ordovician:** The CO₂ concentration was much higher e.g. 444 million years ago but the temperature was similar to the present one, disfavoring the idea that CO₂ has a big impact. Cook cites a paper by Dana Royer which assumes that the solar constant was 5% lower at the time - which is plausible but supported by no further science in the paper. The paper observes CO₂-temperature correlations but, much like Al Gore, fails to see that the bulk of this correlation is explained by the temperature's impact on CO₂, not the opposite influence. Because of this reverted causal relationship, it's a fundamentally flawed paper. Geological arguments like this one do indicate that the climate sensitivity can't exceed 1 °C much. A linear regression gave us 0.9 °C per doubling.
95. **It's not happening:** Quite a general point after these specifics. Cook's "new" arguments are that everything is "accelerating": it's been discussed many times. Nothing is really accelerating. And the warming in the early 20th century was actually pretty much the same as the warming in the last 35 years, suggesting no role for the humans (whose activity got much more intense since 1900). Claims about "acceleration" are cherry-picked observations from noisy graphs or downright fabrications. Cook's additional argument is that plants and animals are migrating closer to the Pole. This may statistically be the case - but they've been arguably doing such things for millions of years. And let's admit, even if the warming were important, the behavior of the animals is more rational than what some people recommend to the humanity. Birds don't stop building nests or using their key means of transportations such as their wings but they just migrate if they feel too cold or too warm. A migration by a hundred of miles can completely undo the temperature effect of a Fahrenheit degree of warming. That's enough of a reaction to 100 years of warming for a sensitive yet sensible organism (or species).
96. **Global temperatures dropped sharply in 2007:** Cook says that it was due to La Nina and "exacerbated by" low solar activity. He gives us two reasons but he can't say what is the relative weight of the two phenomena. In fact, in other points, he dismissed the possibility that the solar activity may matter. The reason why he gives us two causes is not that he actually knows that both of them operate - but because a bigger number of non-CO₂ reasons will make it more likely for a naive reader not to think about the links to CO₂. Whenever it's cooling, it's cooling because of dozens of natural causes. Whenever it's warming, it's only warming because of man-made

reasons. A simple propagandistic exercise - and Cook's readers must be really silly to buy all of his statements, especially in this awkward combination.

97. **Trenberth can't account for the lack of warming:** Kevin Trenberth admitted that we can't account for the lack of warming and it's a travesty that we can't. In other words, the climate scientists have no idea what's been happening with the climate in the last 15 years. Yes, as Cook agrees, it's because of the internal variability and energy flows they can't understand right now. So it seems that Cook agrees with this point - it is not really possible to disagree. So he at least tries to spin this point by suggesting that the misunderstood internal variability and uncalculated energy flows don't matter. Of course that they do matter: they're what this climate problem is all about. However, Cook thinks that a public support for the AGW orthodoxy by Kevin Trenberth is more important than that they have no clue about the causes of the recent cooling etc. However, people who think rationally about this problem realize that what matters is the understanding of the energy flows - which doesn't exist - while some public religious rituals in which some IPCC representatives endorse some basic religious dogmas don't matter for a scientific conclusion. Cook's hierarchy of values is unfortunately the inverted one: religion matters and equations don't.
98. **It's CFCs:** Cook says that the greenhouse effect from the (ozone-depleting) freons may be negligible. And it may be. But it may also matter, especially in combination with other things. Various people have tried to link the ozone hole and the global mean temperature in various ways. Cook apparently doesn't like it because it dilutes his CO2 message, so he doesn't discuss these papers even though he pays lots of attention to less important or convincing papers involving CO2. Well, I am not thrilled by links between freons and the climate, either - except that it doesn't matter what we feel. There could still exist such a relationship. It's not just about the direct IR absorption that may be negligible. The UV absorption and modified chemistry and biology may matter, too. The inherent strength of freons as greenhouse gases is huge. For example, HFC-23 stays in the atmosphere for 200+ years and it is more than 10,000 times stronger a greenhouse gas than CO2. It's clear that if we say that the greenhouse effect is important, we must look at methane, freons, N2O, and other things, too.
99. **CO2 emissions do not correlate with CO2 concentrations:** Well, I agree that in the long run, the CO2 concentration demonstrably increases because of the CO2 emissions. The isotopes are an extra way to demonstrate it. However, it's important to note that this point has nothing to do with the temperatures. Neither CO2 concentrations nor CO2 emissions are significantly correlated with the global mean temperature - not even at a multi-decadal scale. It follows that they won't probably be too strongly correlated in the future, either. It is a childish mistake to imagine that by changing our CO2 emissions, we will be "directly" changing the temperature. The influence is pretty much undetectable.
100. **It's ozone:** Cook says that O3 stopped declining in 1995 while the temperatures continued to grow. Well, they surely continued to grow less than expected by the AGW advocates: there has been no statistically significant warming since 1995, after all. The ozone could matter - and it could also matter with the opposite sign than he assumes: many of these points have been sketched in point 97 about the freons. More generally, you can see that Cook has an extremely biased attitude to all these

questions. Whenever there is a potential climate driver different from CO₂, he is satisfied with a tiny glimpse of an imperfection - showing that it's not a perfect explanation of everything - to conclude that the effect is completely irrelevant. Whenever CO₂ is the candidate, he is ready to ignore any problems, add any extra adjustments and additional effects employed as "minor slaves" of the CO₂. This is not a rational attitude of a scientifically inclined person: it is the approach of a hopelessly biased religious bigot.

101. **It's satellite microwave transmissions:** Well, while it's ludicrous to claim that the energy emitted by the satellites can cause a significant warming (I surely agree with Cook on this one), similar effects should be carefully checked when the same microwaves are being used to measure the temperature from the satellites (and I believe that they're thinking about it). When demonstrating that the satellites' energy is negligible, Cook makes elementary errors in arithmetics: 5/500 is not 1 but 0.01, so the real result is 100 times smaller than his figure: the satellites are too weak by a factor of 100 million, not 1 million.
102. **Tree rings diverge from temperature after 1960:** We have already discussed the divergence problem in point 84. Cook repeats his preposterous conclusion that the divergence itself has to be man-made, too. In particular, he blames the divergence on "global dimming" and "man-made drought". The only evidence that the tree proxies worked before 1960 is their rough agreement that existed for a few decades but broke down after 1960. Note the dramatic difference in his interpretation of similar "divergences" in various contexts: when some of the impressive graphs showing the correlation between cosmic rays and the climate failed to be convincing after year XY, Cook immediately uses it to throw the whole cosmoclimatology away. But because he apparently likes tree proxies, when the correlation between trees and temperature fails - and it's been failing for 50 years - he invents new effects (and man-made ones!) that must surely be responsible for this divergence. Once again, double standards caused by the lack of objectivity if not religious bigotry. Even if drought or dimming were the reason for the "divergence", similar things could have occurred in the medieval period, too. There exists no good evidence that we can actually determine all the relevant factors that decide about the width of the tree rings.
103. **A drop in volcanic activity caused warming:** Incredibly, Cook says that such a drop could have caused (a part of) the early 20th century warming but it couldn't have worked recently. Does he postulate another jump in the laws of physics? While he's eager to cite papers that "work" and explain the early 20th century warming, he doesn't cite any recent papers. After all, there have been no recent large volcano eruptions: the 1991 eruption of Mt Pinatubo remains the latest large eruption and it's been almost 20 years. If you look at his very own graphs, you will see that the eruptions in 1880-1920 were more frequent than those in the recent decades. So his own methodology doesn't support his conclusions. He's inconsistently mixing and spinning papers about different things, comparing apples and oranges with his predetermined conclusion that apples are more orange in color.
104. **We didn't have global warming during the Industrial Revolution:** Cook correctly says that the CO₂ emissions were a tiny portion of the present ones. Around 1800, they were 100 times lower than they are today. The only problem with his argument

is that we actually did have global warming during the Industrial Revolution. I recently published the texts by Thomas Jefferson about climate change that sound almost indistinguishable from the "modern observations" of climate change even though they are 200 years old. Similar observations exist when it comes to the melting ice and other aspects of "climate change". So the real problem is not that we didn't have global warming during the industrial revolution: the real problem was that we did have global warming - or cooling - during ages when people could already observe the world but they were not yet emitting any substantial amount of CO2.

105. ***Southern sea ice is increasing:*** *Cook agrees but says that it surely has nothing to do with warming or global climate change. It must be due to "complex phenomena" such as changes of the winds and circulation. Note that such comments would be unthinkable if he tried to discuss the Northern sea ice. As we have noticed, all "warming" observations are about the climate, important signals that you should appreciate, worship, extrapolate, and be afraid of. On the other hand, all "cooling" observations are just an irrelevant weather that you should dismiss, humiliate, and spit on. With such a biased attitude, it shouldn't be shocking that Mr Cook ends up with an irrational orthodoxy based on 104 largely obscure misinterpretations, misunderstandings, and myths - and that his opinions about the most important questions are upside down.*

There exists no climate threat and there exists no empirically rooted evidence that the human impact on the climate deserves the attention of anyone except for a few excessively specialized experts who should investigate such speculative questions. All opinions that the climate change is dangerous, man-made, or even relevant for policymaking are based on the irrational attitude, cherry-picking, intimidation, censorship, and the general sloppiness of the kind that Mr Cook has shown us once again.

And that's the memo.