

Science must end climate confusion



VIEWPOINT
Richard Betts

Climate scientists need to take more responsibility about how their work is presented to the public, suggests the Met Office's Richard Betts. In this week's Green Room, he says it is vital to prevent climate science being misunderstood or misused.

Recently, I gave a talk on climate change in my local village hall in Devon, and not surprisingly I was given a hard time.

In fact, it started two days before that. Cut off from work by the snow (which, incidentally, had been forecast with almost pinpoint accuracy), I was out with the kids and being teased by the other dads.

"Where's all this global warming you're always on about, ha ha!"

The usual stuff, leading to the usual somewhat nerdy discussion on the difference between weather and climate, which was then cut short when one of the children crashed their sledge and asked if we had got that on video to send to a TV show such as You've Been Framed.

Of course, we are seeing the same comments in some parts of the press and on Twitter, from those who jump on any bit of cold weather to say it proves that global warming is not happening and we're all a bunch of idiots (or worse).

No matter how many times we say that "global warming" means a rise of average temperature across the world, decade by decade, and not every year being consistently warmer than the last in every place on Earth, there are still those that get this mixed up.

Warming world

Yes, we have had the coldest December in the UK for 14 years and now we are having a big freeze in early January; but the UK covers less than half of one thousandth of the Earth's surface.



Last year was actually the fifth warmest year on record as far as global temperatures were concerned.

The four warmest years were, in ascending order, 2002, 2003, 2005 and 1998. The last decade was the warmest on record, followed by the 1990s and then the 1980s, so the world is definitely warming up.

To be fair, people often make the same mistake but in the other direction, and link every heatwave, major flood, drought and famine to global warming.

Of course, we know that these things happen anyway, even without climate change - they may happen more often under a warmer climate, but it is wrong to blame climate change for every single event.

Climate scientists know this, but still there are people outside of climate science who will claim or imply such things if it helps make the news or generate support for their political or business agenda.

Mixed messages

Climate "sceptics" accuse climate scientists of exaggerating the evidence for human-caused climate change in order to secure their own funding; but actually I think that any vested interests in talking up the problem lie elsewhere.

The focus on climate change is now so huge that everybody seems to need to have some link to climate change if they are to attract attention and funding.

Hence the increasing tendency to link everything to climate change - whether scientifically proven or not.

The question is: do climate scientists do enough to counter this? Or are we guilty of turning a blind eye to these things because we think they are on "our side" against the climate sceptics?

It's easy to blame the media and I don't intend to make generalisations here, but I have quite literally had journalists phone me up during an unusually warm spell of weather and ask "is this a result of global warming?"

When I say "no, not really, it is just weather", they've thanked me very much and then phoned somebody else, and kept trying until they got someone to say yes it was.

Talking up of the problem then gives easy ammunition to those who wish to discredit the science.

They do not care whether the wrong information came from the scientists or from a second-hand source, they just say (quite rightly) that it's wrong and therefore why should they trust other parts of the science?

Climate scientists need to take more responsibility for the communication of their work to avoid this kind of thing.

Even if scientists themselves are not blaming everything on climate change, it still reflects badly on us if others do this.

We cannot simply say it is everyone else's fault; we need to be very clear about what can be used as evidence for or against climate change.

Long-term, large-scale trends and the overall statistics of extreme weather events can and should be part of this evidence base. Individual weather events, from heatwaves to big freezes, cannot be used either to prove or disprove climate change.

Climate data shows that human activities are warming the world

[Journey through climate history](#)



Individual natural disasters are not evidence of climate change

If we do not help the media, NGOs and the public to understand this, we have done nothing to stop them getting it wrong.

If our science is misunderstood and misused, and then turned against us, it really will be a case of We've Been Framed.

Dr Richard Betts is head of climate impacts at the Met Office Hadley Centre

The Green Room is a series of opinion articles on environmental topics running weekly on the BBC News website

Do you agree with Dr Betts? Is climate science being used as a political football? Do scientists need to take more responsibility to ensure their work is correctly understood? Or is the difference of opinions about climate change the sign of a healthy democratic debate?

Most climate scientists publish papers in peer reviewed journals. Climate sceptics have less accepted theories that are not generally passed by the peer review process so they use the internet to distribute their ideas. People outside the academic community cannot gain access to the subscription only journals so a Google search throws up a disproportionate number of hits with convincing pseudo-scientific garbage. Climate scientists have got to make their publicly funded research more openly and easily available.

matthew rea, Edinburgh

It really doesn't take a scientist to realize that the surface of the Earth is indeed warming over the past 15,000 years or so from the last glaciation era. The fact that warming is in effect and has been for all this time is a fact.

What we are worried about is that humankind has increased the rate of warming. That is highly speculative and so far indications point to a "probably". But by how much is very difficult to measure because we don't have accurate records going back 500 or 1000 years. Man's contribution is definitely there, but we should be careful in thinking that we can influence earthwarming as much as many journalists try to convince us.

The extra CO2 in the atmosphere created by mankind may be detrimental to climate and to human health therefore reductions in CO2 levels will be good for our long term health. We saw that with lead levels from gasoline. When lead was taken out of gasoline, lead levels in blood decreased very quickly and people's health, especially children, improved dramatically. CO2 is a waste product in our bodies and extra injection is not good. We have not evolved the necessary biological processes to eliminate higher concentrations of CO2 easily. We may, given millennia, but then again we may not. Let's err on the side of caution.

John Knops, Whitehorse, Canada

i am feeling very sad at the state of information things are now happening at great speed i believe we are heading for a total change in global perspective i believe within the next 2 yrs this planet will be shaken in a massive way some will survive many will die lets not be naive at what is coming at us soon this world needs to wake up dont blame people or what we are doing to the planet we cannot change the world not yet maybe them that survive will this 2012 thing i feel it to be very real lets be ready when i read about the glaciers on everest melting not just the polar ice caps i fear for the people that live of india and the lower regions of the himalayas i see massive floods i am no educated genius as you can see but it dont take much to understand this world is on its last legs

all i can say is brace your selves and be ready i am saying this not to frighten any one i just want to make a point i love this world but the only thing i see is alot of sadness but we cant give up thats nature i am just sad that people are not looking at the whole picture God bless

every one and this is real

Andrew Logan, Newport South Wales

While the argument about climate change is going on, the subject of the explosion of human population remains a taboo. Like many species before us, humanity will collapse if it continues to breed out of control with the complete disregard to available resources.

Is there a common purpose to humanity or is it simply a sum of our individual aspirations? Is there such a thing as an optimal size of human population that will allow us to evolve as a species but would not put unbearable strain on this planet, our only home?

These are the questions that need answers.

Sergel Petrov, Pender Island, Canada

The responses here show just how much people are willing to misinterpret any attempt to be clear and rational about this. It is a complex subject, and Richard Betts seeks to explain that and caution about the misuse by media on all sides but at the same states that it is clear that the evidence and science comprehensively supports man-made global warming. Instead of actually reading that, a lot of the posts only pay attention to the bits they want to hear, and say "he admits its all media hype" - that is NOT what he says, and to claim so is fundamentally dishonest - and stupid! If you make obviously wrong and distorting statements then who do you think you are actually helping - you are destroying the credibility of any argument you might have.

For those who say "why don't we see more climate skeptic views in the green room" the answer is that the green room is science based and the science overwhelmingly supports the man made warming position. There is no solid evidence or theories currently available that actually supports the skeptics - so there is nothing that is really science to write about here. If you think otherwise then Publish the data and science, not just vague statements with no evidence.

Peter Clarke, Auckland, NZ

Sigh... In Northern Hemisphere we are having the coldest winter in years, meanwhile in the Southern hemisphere (ie Australia New Zealand etc) they are having the hottest summer in years. Go figure... Please note it's GLOBAL CLIMATE INSTABILITY that is the issue. Also last summer(northern hemi)/winter(southern hemi) it was the reverse situation. We need to look at the long term trends.

Richard Arnold, Austin, TX, USA

Firstly, every time I hear 'its weather, not climate' I think yes, but the climate is made up of weather, global weather, upon which trends can be established. With 2008 the coldest this decade, and winter 2009/10 shaping up to be the coldest globally for a generation (including China, and the US suffering cold snaps) this does have a bearing on the AGW thesis, as it highlights a cooling trend which now goes back 12 years. The AGW thesis is flawed, it is a totally untestable based on a 'weak correlation = causation' argument anyway and should have been disregarded years ago. However careers now depend on it and it will be defended literally to the death by many regardless of how much the evidence goes against it.

John Bailey, Manchester

It doesn't matter how good your communication skills are, the 'conspiracy theory/climate denier' gang will never hear you.

Unhampered by the democratic requirement to take heed of idiots, the Chinese are greening their economy by trawling the world for the best technologies.

Violent swings in the climate are powerful drivers of evolution - a sea change is about to happen in the distribution of economic power.

Geoff Dalton, Napier New Zealand

I really can't believe people are still denying the environmental damage that is going on right under our noses. It is really time to wake up. You have only to go to places like South & Central America or south east Asia to see the massive deforestation that is going on first hand. We are heading toward a complete ecological melt down. Species are disappearing in huge numbers and we seem to be polluting every corner of the planet. Deny climate change all you like but the planet is a very polluted place you only have to open your eyes and take a walk to see it for yourself.

Gavin Sparks, surrey,england

We need to take the scientists who warn us of climate change seriously because the consequences of any change could be very serious indeed. In the distant past people could adapt to climate change, or they could up sticks and move. They could do this because populations were small and the world was large. But our present world population is so huge, particularly in our cities, that we cannot move or change our way of life easily. The space no longer exists. If any major climate change disrupts the functioning of our cities, there would be economic collapse and no means of escape for the countless millions left in a hostile environment. For us to survive, everything, from the jobs we have to earn our money to the supermarkets we buy our food from, has to function as well as we can achieve. So lets stop the silly blather about which side of the argument is right or wrong, and just understand that a possible threat to our civilization has been identified, and take it seriously,!

so that we can work out how to avoid disaster if at all possible.

Patrick Sweeney, London, England

Interesting article, while linking one off events to either prove or dis-prove global warming is not helpful, even more helpful would be for climate scientists to be clear about what it is, is it global warming or not as the term climate change can cover every type of weather event possible. The other way that the debate could be helped is if that anybody who doesn't agree with the man made global warming lobby isn't treated like a small child who just doesn't get it. A lot of people get it very well, they just don't agree with your poor science and particularly the spurious links to human activity, it's not the way the message is being understood that's the problem, it's the core work itself that's flawed and starting with a premise that "humans are to blame, lets prove it".

Patrick Bramman, Leicester

To "Mardin M, Manchester"

"Look at the poles. They are melting should they melt? According to the history they were always cold, and now they are melting for some reason."

The actic region had less ice on it 1300-1000 years ago than it does now. Did the Vikings drive SUVs?

"Its getting warmer, colder, the climate is CHANGING. FACE IT."

You've not done your homework. FACE IT.

Robert Leather, Manchester

To Steven Black, Sydney, Australia

"The IPCC comprised thousands of scientists from around the world who concluded that the world is warming and that the change is probably being caused by human activity. "

Actually, if you'll bother to check the details. The IPCC didn't contain "thousands of scientists" it was a lot fewer than a 100.

The remaining "thousands" were made up of regional and national policy makers and politicians. Not scientists.

The Intergovernmental Panel on Climate Change is primarily a political organisation to promote the understanding of climate change.

Robert Leather, Manchester

I began reading this article and immediately thought "Here we go, another piece of warmist apologia, going on about "weather" v. "climate", etc.". However, fair dues, he makes good points about the ludicrous over-selling of climate change in the media (let's be clear, in my view the BBC is a major culprit of this). My only quibble with the article would be this: why wait until now to make these valid points? The outrageous misrepresentation of climate change in the media ought to have been challenged by the likes of Mr. Betts long ago...

Why were you silent when it appeared that random weather events were being systematically linked to "global warming"? One final point: why does the "Green Room" never give space to articles from "global warming sceptics"? Where is the platform for these views on the BBC? The odd reader's comment sneaked at the bottom of the usual "warmist" article is not enough.

Wang, brussels, belgium

I think there are many journalists out there who don't get things mixed up, but positively print outrageous stories in order to get noticed and make a name for themselves. They may live to regret it in old age when they sit there admiring their awards for this or that story, sweltering in 50 degree celcius temperatures awaiting the arrival of the next hurricane!

steve, Cannock

One commenter notes it's cold all over this winter. Not so. In vast areas of Eastern Canada it has been warmer than usual. Temperatures have been about 15C above normal in parts of Labrador so far in January, and here in New Brunswick the average daily max temp is over 5C above normal and night min temp, more than 10C above normal. In large parts of the world, population density is low and so is media interest in those areas. Attempting to draw conclusions about global temperature trends based on popular media coverage does not work well.

Rob Hughes, Fredericton, NB, Canada

Dr Richards Betts, head of climate impacts has presented a lot of logistic points in his article and I am giving him thanks. No, climate science isn't being used as a political game. It is really a big problem in the world. From very beginning, when, science has started its journey, then, there were a lot of misconception raised like this. Not only was that, Scientists were hurt by the fool people. But, science was not changed. Rather, science has been explored its jurisdiction. It is pure and it could not be changed. Definitely, Climate scientists need to take more responsibility to ensure their work is correctly understood and presented to the public. At present, people are having a big freeze in early January and made some such comments. And it is happened only due to the lagging of communication with the public

Engr Salam, LGED, Kushtia, Bangladesh

Thank you, Mr Betts, for something that has needed to be said for far too long. Yes, you are absolutely right: global warming has become little more than a huge global political football. It has gained so much momentum that it's now impossible for anyone - including scientists -

to make any statement that appears to even slightly contradict the hyperbole of the politicians, journalists, and other AGW alarmists and extremists.

David, Cheshire

I find it rather saddening that Joe Public feels somehow qualified to comment in this kind of forum on the validity of scientific research, simply because he's 'seen a lot of TV shows'. If what climate-change scientists learn makes us unhappy, we can't just shake them up like a magic 8-ball in the hope a more pleasant answer will bob to the surface. We believed them about smoking causing cancer, the depletion of the O-zone layer and Amazonian deforestation - what's the big leap of faith here? Typically, we only believe scientists when the lifestyle change they insist we make is one that is relatively simple and convenient. When it comes to scrapping our car, we're all suddenly sceptics.

Jack, Beijing, China

The IPCC comprised thousands of scientists from around the world who concluded that the world is warming and that the change is probably being caused by human activity. People are entitled to their own views but unless we claim to know more than the acknowledged experts we should listen to them. Judging by the comments to this article, scientists need to do a better job in communicating the consensus view.

Steven Black, Sydney, Australia

This article is one big step for both the BBC and the Met Office - an acknowledgement that many AGW (anthropogenic global warming) believers routinely link as many weather events as possible to AGW - cold weather being about the only one you can't (except those who link it to a Gulf Stream switch-off). Now the BBC/Met need to keep this 'balance' going. Honest science is more valuable than scaremongering. Perhaps there are more important proven concerns to spend our time and money on than this theory. (malnutrition, poverty, lack of clean drinking water, etc, etc)

oakwood, UK

No offence to Dr. Betts, but it is worth noting that his job title is "Head of climate impacts"

graham chambers, Luxembourg

The reason Dr Betts is pushing the assertion that climate change is anthropogenic (in response to allan jones), is because among the academic scientific community, the debate on this topic is in the past. More than 95% of the scientific community are unanimous in their belief in climate change, and climate change caused by humanity. The science academies of the world, the Royal Society in the UK and its peer bodies in every other nation all agree on this. It is only among non-scientists that this is a debate at all, and this is because of the fact that scientists are being misrepresented or misquoted or are not taking care to ensure that their message gets across accurately, as Dr Betts acknowledges. If you pick up a science journal or a popular science magazine, you will find that column inches contesting climate change are as plentiful as those on the literal truth of the virgin birth. As long as we, the non-scientist public, continue to take our scientific 'conclusions' from bloggers, politicians, and fossil fuel lobby groups, we will continue to be misinformed.

Graham, Sydney, Australia

The main problem is that climate science has become showbiz. The calm study of climatologists such as Perry and Perry, H H Lamb or D Q Bowen has been surpassed by celebrity climate. You only have to look at the way the weather forecast changes almost by the minute in this cold spell to see why the public are dubious of weather or climate forecasts. It is my opinion, that whatever the real reason for a changing climate, the overuse of lazy and readily available data churned over by robotic models always errs on

the catastrophic. Unfortunately, Mr Betts, the Climategate Scandal, the antics of Ethical Man and the current investigation by the BBC Trust into bias, shows that you have a long way to go to recharge the confidence of the public. In essence climate or weather forecasting is as much an art as a science - live with it.

Trefor Jones, Resolven

In recent times, every patch of "unusually" hot weather (or stormy weather, or many other kinds of weather) has been followed by a chorus of claims from environmentalists that this constitutes proof of global warming. I have never seen a single climate scientist then rush to say that the unusual weather in fact proves nothing because there is a difference between climate and weather. Why are we only seeing this now, when the unusual weather appears to go the "wrong" way? It suggests a lack of objectivity. As a professional scientist, my feeling is that the leaked CRU emails reveal a pathology in the science supporting the existence of significant anthropogenic global warming. The scandal has irreparably damaged public confidence in the argument, and rightly so. What we need is not more explanations to ensure that the science is better understood, but more and better science. Instead of patronising articles on the difference between climate and weather, we need clear explanations of, say, the data selection used in the tree ring surveys conducted by CRU, the occurrence in the past of very high atmospheric CO2 levels with low global temperatures, and so on. The public is neither as stupid nor as ill-informed as climate scientists appear to think.

Peter Weinberg, London, UK

I suggest that something easily understood needs to be used and publicised as an indicator of global warming be it a natural cyclic phenomenon or indeed the result of human activity, current readily available information fails to convince many with no headline information as to where the headline figures came from or were developed. Temperature probes between 1 and 1.5 metres below soil level in green field areas, normally undisturbed over many years should be able to demonstrate an upward trend in temperature over the years (should this be so) with a smoothed value showing little reaction to short term weather related phenomenon. Probes would need to be all over the world to avoid influence from variation due to changes in regular wind patterns and ocean currents. Perhaps this has already been done or is in progress but I have never seen any reference to such in the normal general news outlets.

Ian Coton, Penang, Malaysia

Can you really blame the free thinking people in the world for being "sceptics"? Lets take the science away for a second and just look at this from another point of view. I am a keen follower of this whole environment debate, I'll absorb anything I can get my hands on which relates to the environment and climate change. One thing which I've noticed happening more and more is the inconsistency in information given to us by the "non-sceptics" or "government funded scientists" (basically scientists which relate everything to the warming of the planet for funding). Let me give you an example; the past few summers, the UK has seen large amounts of flooding in urban areas which the media and "non-sceptics" openly link to the warming of the planet and not because these places are built on flood plains to save cash. Now I'm sure most people would agree that rain can be described as "weather" and not "climate". So then why is it when the entire northern hemisphere cools down for a few months it's put down to "weather" and not "climate"? I'm not trying to preach that we don't have something to do with the warming of the planet, because we clearly do. CO2 does have some effect on the Infra Red radiation from the sun trying to leave our

atmosphere. But the question which they still won't answer is how much of an effect? And also what else contributes to this warming? This begs the question about the computer simulated climate models which are the talk at the moment (it does sound impressive though doesn't it). If I could ask the creators of these models one question, it would be this. If you can't accurately predict the climate for next year, or even next month using man made climate models, then how am I supposed to believe you can predict the climate for the next 100 years? You have to question their motives.

Jason Howmans, Staffordshire, UK

People keep mixing up 'weather' and 'climate'. The problem is not that climate change happens, of course it does, but it is happening too quickly for many (poor) human and wildlife populations to be able to adapt successfully for long term survival. The human race once acted successfully to stop CFCs from creating irremediable holes in the ozone layer - pity that it hasn't proved possible to have the same 'can do' attitude about greenhouse gases. Ref global warming: people are wrong when they confuse 'average' temperature rise with real temperature rise on the thermometer. You can have heatwaves and big freezes, and temperatures may vary as much as 10°C during a single day - that's just weather. But 'average' temperatures are taken across the planet, and there are millions of readings, which is why huge computers are needed to crunch the data; a 0.5°C average temperature rise over a decade or so is very serious indeed. But non-scientist general public doesn't see that because he doesn't want to.

Caroline W, Brussels, Belgium

Fair minded and interesting But yes still pushing global warming based on a long term trend. The Mets seasonal forecasts are poor because they are based on that model and most conform it appears to the politics of AGW So they are as guilty as anyone of confusing the public as to what is weather versus climate! No more global warming politics dressed as seasonal weather forecasts please!

Paul Kerr, Belfast

What temperature should it be? If people die because it is freezing everywhere, is that worse than people prospering because it is warmer? Can you say it was a bad year in 2020 because we had to burn the garden fence in July because we were freezing? Then Granny and Grandad died of hypothermia because it was .7degrees colder in December but we had no electricity because we could not use coal to heat our home? ADAPT - humans did it in the Mediaval Period - they can do it in ANY PERIOD!!! Don't get wrapped up in the science.

Thorne, UK

Henrik Svensmark at the Danish Space Centre Climate Research Unit is correct in his assertion and research that demonstrates a correlation between inevitable global climate change that has been going on over the last 100,000 years. In short change the debate to SUSTAINABILITY given the fact that it is Nature & Man who is responsible for what is happening around the globe. Given the doubling of human population in the next 50 years and diminishing resources why don't we figure out how to make food, shelter, energy and continued purpose for humanity versus the terrible prospect of humans slugging it out when collapse happens. The prospect of a science fiction "Soylent Green" ending is not a pretty prospect. Time for us to move to sustainability for all.

David F Pawlowski, Michigan USA

Dr Betts says current UK weather was "forecast with almost pinpoint accuracy". Sorry, I believe they forecast a mild and warm winter (ref WeatherAction.com) as they also did (incorrectly) for 2007 and 2008. But that is besides the point. As we know, when it's warm

that's climate. When it's cold that's weather.

Martin Judd, Melbourne, Australia

Another huge problem is that the "science" on global warming is locked away in science journals behind hugely expensive paywalls. Please. I could feed a family of 4 for a month on what it takes to access just a few articles. You will NEVER reach the public that way. WAKE UP AND SMELL THE OPEN ACCESS!

Ann Z, Aurora, IL USA

Good article. However, a few points do need to be made. We know the difference between weather and climate, but on numerous occasions, the weather (indeed famine, flood and drought) have been used to confirm possible global warming, contrary to the articles early statement. The met may not say it directly, but their masters, the politicians do indicate a connection between weather, famine, floods etc to the GW theory. We do hear it all the time. The article is right about clearer communication to make the science better understood, but this means ensuring the interpretation of the data can be explained in many ways. (I think politician and the media assume the public is not very intelligent. The public are more intelligent than most politicians and media reporters. Richard Black has shown lack of foresight on many occasions.) Politicians do not understand the science any better than joe public, their job is to make policy based upon the science. The recent article about 800,000 years of CO2 is an example I can refer to where the implication of Richards message was in stark contrast to what the data was telling me. I think if the global warming issue is not rammed down peoples throats and the science is explained subjectively then people may start to listen more. Sustainability has it benefits. Push for low energy consumption and renewable resources etc but is there a need to tax people for excessive CO2. (That I believe is still up for debate) I am not a global warming denier or otherwise. I believe global warning is natural, but man made GW is not conclusive. But I believe in sustainability and the appropriate use of resources to prevent pollution, deforestation etc.

Nicholas Mills, adelaide, Australia

I do hope your anti natural resource people are shivering in the dark during your current period of global warming

Phil, Houston Texas

The ignorance in some of these posts is breathtaking. For God's sake, READ THE SCIENCE, and don't post anything till you've understood it.

Mr Henderson, Teddington, UK

The world is a business, science is part of this world so too needs to be marketed correctly. I have never thought about it like this, what a weird world we live in.

Martin, Leeds, England

Dr,Betts, along with others here, make many valid points, but what really sets me against the whole notion of global warming, is the way in which Met.Offices have been hijacked as the weather wing of governments and used thereafter for their own political agendas. I cannot accept that medium term(how long exactly?)forecasts are little more than guesswork Alan, as we were making reasonably accurate long term forecasts in determining our strategies during the second world war. The Met office, and their technologies have undoubtedly come a long way since then. Whilst we ought to recognise the significance of their findings based on their technologies, what we ought not to do is state categorically, in the absence of equally firm evidence, that these changes are as a direct result of human activity. People are now rightly disenchanted with the significant amount of political interference in their lives, and this serves as another good example of how governments

ought not to handle, far less politicise what may, or may not prove to be a relevant issue.

Robert Brown, Carnoustie Scotland

Allan Jones, Warrington, takes an all too common stance - these things are not well understood, there has been climate change before, scientists are not agreed, it is some kind of conspiracy to scare people. Climatologists worldwide are almost universally agreed that the increase in atmospheric carbon dioxide, caused by mankind, is causing extremely rapid climate change (rapid compared with fluctuations over the life of the planet). Yes, the process is complex, yes, there is much more yet to be understood. But this is no conspiracy to "scare" people off using fossil fuels. And the inability to predict local *weather* over a relatively short period has little to do with predicting global *climate* over a rather longer period. The real fear is that massive and catastrophic warming could be unleashed by the release of enormous quantities of methane as the tundra thaws out. If that happens to any appreciable extent, we could well be talking of global baking.

JOHN WARD, Bideford, UK

I do find it disturbing that 'weather' is in fact often pointed to as evidence of global warming, when as Dr Betts says no such claim can be made. Worse, I find it disturbing that filters are applied to temperature data without clarifying the assumptions such filters hide. For example the 'annual average' seems to be 'halfway between max and min for each day, averaged over a month, weighted by the distance between local weather stations, with the 30-year such average subtracted, averaged for all such data points, then with a 9-year (or sometimes 13-year) binomial filter applied': this is a set of (often non-linear) filters, each of different type, that are signal-dependent in their effect, yet I see very little discussion of such basic signal processing in terms of sampling theory and linear systems modelling. For a very simplified example of why this matters, if you take a 9-year average then you will never ever see any cycle whose period is 9 years. When you filter data, you impose your assumptions about how the data behave: you can only do so with impunity if you can identify those assumptions and justify them. It is therefore a pity that these algorithms seem to be kept secret, and I do not understand why this would be done.

Chris Bore, Woking

An article driven by frustration and need to tell the story. All the more sad to need to tell him; "look up from this one little tea cup and see the bigger storm". Climate change is only symptom, and focusing on it distracts us from the real problem; The problem is too much Human Activity (Number of individuals) x (Individual Impact) We are ripping up the planet faster than it can cope; that's the real problem. And, for all this guy's clearly spilled frustration; we are now talking to the wrong people. However passionate and noble; climate scientists are the wrong people to talk to from here on. Yes they can give us blow by blow accounts of one symptom; they can tell us how bad its getting. But they can't fix the fundamental problem. To fix the mess we are plunging into, we need to go and talk to the guys on the other pages of the BBC website. We need to walk across the hall and go shake hands with the guys in grey suits. If we want to save the human race; the tie-dye, happy-clappers have to stop wringing their hands, and they will have to go shake hands with the guys in red braces. It's time to go talk to the guys who are getting us deeper and deeper into this mess; Those guys who sold us the dream of the Emperors New Clothes; "more more more" For all this chap's obvious frustration with the cheap jokes at his professional expense; this is really a trivial side show detail; The thing we need to know is how much faster the "more more more" guys intend to rip up what's left of Planet Earth. A climate scientist is frankly out of that loop. They are logging what happened. For 2010, we need

what the guys in suits have planned; they are the ones that are getting us deeper and deeper into this mass extinction. We need to know their plans. How fast do the marketing guys intend to rush the 2 billion low-impact people, across to join the 2 billion people on this high-impact side of the boat, and capsize the whole thing over; What's the time scale for doubling Human Activity levels, and the damage being done to the planet, guys ? 3 years ? . . . 2 years ? . . . 18 months ? That's the question we need answering, and a weather scientist with a thermometer is the wrong guy to ask about that. A heartfelt piece, written by a nice bloke . . . but sadly in the wrong part of the loop. Sorry Steven

Steven Walker, Penzance

I think this is a fair minded comment I'm glad the problem with the media misrepresenting science is highlighted. I think the Met Office should give up long term forecasts. If the models they are using are based on global warming this will increasingly represent a poor forecast(as they are based on long term averages designed to make a political point). Promises of barbecue summers and mild winters are also confusing climate with the weather

Paul Kerr,

Depressing reading (the comments as much as the article). Lets put it this way- Global Warming happening & we do nothing = Major Problems Global Warming happening & we make changes = We have a chance No Global Warming & we do nothing = No Change No Global Warming & we make changes = some upheaval, cheaper/renewable energy for all, job creation, cleaner air etc etc Sorry but its really a no brainer

Kat, Lincs

I really am unsure about climate change and find the nit-picking (on both sides) rather hypocritical. Yes, we mustn't read too much into recent and local weather, but the pro-warming group continues to quote data for the last 20 or 30 years ad nauseam. What about the last 8000 years or so? Do you really think there are no other valid scenarios? Could we be totally wrong?

Skeptic, Bognor Regis

I hate to break it to you, but the cold is not just in the UK. It's in China, Russia, USA, North Korea, and on and on. There is record cold over much of the world right now. It's even cold in Miami, Florida!

Clint, Medina, TN

That's a good article. For the sake of an objective post, I'm not going to state my own view. The main issue with climate science is that it's not simple - it's hideously complicated, and many people on both sides of the debate are using the issue as a political or professional tool. The only way to combat ignorant assumptions is with clear science and transparent research; and acknowledgement of the fact that pretty much any science is incomplete.

Luke Kavanagh, Cheltenham, England

It's funny how a cold winter is proof of nothing but a couple of hot summers and it's the end of the world?

David, London

It is tempting to blame climate change when there are warmer than normal weathers. But still, it is pretty abnormal to have winter starting without snow and snow melting early. Even though we have lots of snow and freezing this year, the year was otherwise warmer than normal. There are not only weather and climate, but also different kinds of cycles. We can blame cycles too. But if it is cold cycle and it is still warmer than normal, then something should be wrong. Also winters were colder and had more snow when my

grandfather was younger. Having lots of snow starts to feel more like an exception than the norm. Hard to say what is correct, though, I am not an expert.

Suomalainen, Tampere, Finland

I don't understand, even if you ignore the recent months, there still hasn't been any statistically significant globally averaged warming for 15 years! We are all just pagan weather-worshippers making sacrifices to our weather gods! Will we ever learn?!

Harry, London

On the one hand I agree with Dr Betts - scientists do need to make their work far more public. On the other hand I have to say I am now a confirmed climate skeptic - confirmed not by so much by the claims of Phil Jones et al, but by the extraordinary extent to which the 'hockey team' went about keeping the information to themselves; the flawed peer-review system; and their attempts to discredit (and threaten) those who would question their methods and conclusions. The e-mails are, quite simply, mind-boggling... In a sense the whole concept of the IPCC is wrong - 'Intergovernmental Panel on Climate CHANGE'- surely that implies an assumed outcome..? Wouldn't ..Climate RESEARCH' be better..? The whole process has been far too politicised for a balanced view to emerge - and has just given every government on the planet the excuse to increase tax. I would also question the assertion that the past few years are the warmest 'on record' - what happened to the 1920's/30's..? What about the famous 'Medieval Warm period'..? Surely Dr Betts is not falling into the trap of only considering temperature records since 1960..?

David Simmons, Cambridge

I completely agree with Dr. Betts, being from the US not only do I get the wonderful opportunity to see some of the worst journalism available in the developed world but also a democratic system that has a dualism fetish that undoubtedly covers the climate issue. The lack of knowledge between both the journalists and the public only creates democratic debates involving points of views that often is misinformed, partly true, or fallacy. It would be nice if the issue, needless to say quite an important one, be understood by a greater portion of our population, our journalists and news teams, and politicians alike rather than ignorant arguments, spoon fed simplifications, and democrats and republicans taking sides on an issue that deserves to be considered on the same level of importance as national security, not abortion, gay marriage, etc. It is, however, a complicated issue to fully grasp. Although there are simple truths that get thrown around and perhaps the basic concept is understood, but they hardly explain the full scope of what has/is happening, and what needs to happen in order for us to stabilize or reduce CO2 emissions. Unfortunately it may take more extreme climatic events for us to believe that human caused climate change is causing a host of environmental problems, but until that happens, enjoy the showcase of ignorant ideas from some of the less than savvy cretans that somehow found their way onto an American media platform.

Andrew Trumbull, Evanston, Illinois. USA

Most people know that the world is getting slowly warmer and do not dispute the scientific fact of Global Warming. It just becomes much harder to sell this fact to the general public when you're skating into work every morning.

John, Craigavon

For the last eleven years the global temp. has been decreasing. The polar bear population has been increasing for the last 20 years and now NASA says they miscalculated the ice cover in the arctic. There is a much ice there as there was in 1979. 1998 was not the warmest year on record. 1934 was. Global warming is a religion not a science. It's based on

faith not fact.

Dr. J. S. Zannucci, Knoxville, USA

I don't think scientists need to take more responsibility to ensure their work is correctly understood. I think they need to take more responsibility to ensure that their work is correct.

Michael e forster, Lewes, de usa

I do not agree with Dr. Betts. It is true that there is a climate change we all know that but we just don't want to admit it. For example Poland is a country which winters are very bitter. Last year there was no snow. This year its the opposite. I just can't understand Dr. Betts. Look at the poles. They are melting should they melt? According to the history they were always cold, and now they are melting for some reason. Its getting warmer, colder, the climate is CHANGING. FACE IT.

Mardin M, Manchester

I have watched numerous television programmes about the effects of climate change. Most have predicted warmer wetter summers and shorter colder winters due to the gulf stream changing course. It's not that the information isn't out there, its that people are selective about what they take in. As a result the general media are selective about what and how they report things. It's created a sort of self sustaining reaction. It's also worth pointing out that a few months ago there was reporting that the Sun's solar activity had been decreasing for the last ten years, that this was a regular thing and had resulted in very cold winters in the past. To the point the Thames froze. Lots of astronomers were interviewed and it was very interesting. As far as I can see the media has completely forgot about this. I not saying that the current cold snap is a result of it, but it would be nice to have some debate about it.

Justin Ellis, Bangor, Co. Down

Dr Betts makes a lot of good points, and yet still manages to push the assertion that climate change is human-centric. However, that's far from being proven. I'm not saying that human activity has no effect by any means, but climate change is a natural process that has occurred many times before (e.g. ice ages, farming in greenland). Does this mean that we shouldn't do anything? No, of course not - clean air is a good end to itself, as is ending our reliance on fossil fuels and reducing our consumption of both energy and resources. But trying to use climate change as a means to scare people into it is a bad idea. Ultimately, we can't even predict the weather with a degree of accuracy in the medium term, so long-term climate forecasts are little more than guesswork. To make it worse, the mechanisms are poorly understood (e.g. some scientists claim that CO2 is a big problem, whereas others suggest that CO2 lags behind climate changes, and others suggest that water vapour has a larger greenhouse effect, etc). Either way, it's not worth worrying about, as there's very little that the insignificant human race can do about it when mother nature decides to flex her muscles.

allan jones, warrington, england