



'Climategate': a salutary episode

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I am not a climate scientist, like the vast majority of people commenting on climate policy and its implications. We have to take a great deal on trust about climate science, since we are not competent to investigate and assess it in depth.

Having read a great deal on the subject and spoken to many experts, I consider that the evidence and the modelling eminently justify urgent and radical action on a precautionary 'insurance' basis, and I regard much of the activity of so-called 'deniers' and 'sceptics' as mischievous at best and deliberately mendacious at worst.

However, in some ways I welcome the uproar over the emails stolen from University of East Anglia, and I think that 'Climate-gate' carries some salutary lessons for proponents of radical action and for the majority of climate scientists who back the theory of man-made global heating.

These lessons are that:

- 1) the science is not a 'done deal' and never can be;
- 2) the science is a human process and inevitably bound up with values, worldviews and interests;
- 3) climate science has implications of such scale and impact that debate and assessment of evidence must be as open as possible;
- 4) those in the 'climate consensus' need to be far more sensitive to issues of social and cultural reception of their findings and to the poor level of media and public understanding of science.

1) The science is not a 'done deal'

The claim is often made that 'the science is in' - that is, there is no room left for debate about the facts of climate change. This is true up to a point. There is no dispute at all, or should not be, about the basic science of the greenhouse effect and the interactions of greenhouse gases, ecosystems and climate. The chances of our injecting vast quantities of GHGs into the biosphere and not having any impact on the climate system are zero.

Nor is there any doubt that atmospheric concentrations of GHGs have gone up, and that this rise is correlated with industrial development and emissions from it over two centuries. Nor is there dispute about the many observations of local heating around the world.

But to put all this together into a coherent and correct picture of global change is not 'normal science'. It depends on a mix of observations, complex and difficult historical reconstructions of climate and GHG concentrations, and extremely complex modelling and scenarios for future climate-emission interactions. All this depends on many contestable assumptions.

The reason we can have confidence in the analysis is the global peer review process, a highly conservative one, culminating in the assessment reports of the IPCC. But having confidence in the analysis is not the same thing as having certainty. Our understanding of the climate system is provisional, given its complexity; our models are limited by this.

The science cannot be a 'done deal', because if we postpone action until our knowledge is far better we will very likely have left it too late. The science is good enough to justify



precautionary action on an insurance principle; it will never be good enough to give us 100% certainty about what we should do and what threats we face. A conclusion from this is that proponents of climate action should be suitably modest about the degree of certainty we can draw from the science, and argue from the insurance principle, that given what we know and have good reason to suppose, it is overwhelmingly rational and sensible to take preventive action.

2) The science is a human process

'The scientist' in public, media and political imagination is a boffin who does experiments and deals in ideas that are either 100% right or 100% wrong. In reality, and especially with climate science, the answers to questions are not a bald Yes or No but rather 'It depends'.

The scientific analysis is bound up with values, worldviews and interests. The 'sceptics' make much play of the potential vested interests of climate scientists, as if they have none of their own, but of course all science is conducted in a social and economic context and is an all-too human process.

The climate-gate emails show this: the scientists in question are (of course) not emotionless about their work, are convinced of the dangers humanity is courting, and are stung by the tactics of the sceptic movements. The risk for them is that their inevitable emotional commitment to their work and its implications leads them to defensiveness and evasive tactics - a gift to their opponents, as it has proved to be.

None of the emails indicate fatal flaws in the evidence base or modelling, but some indicate a defensive and embattled mentality that can play into the hands of the unscrupulous parts of the sceptic camp.

3) The implications of the science make great transparency an imperative

The science is solid but the prescriptions that can be drawn from it are highly contested. How can it be otherwise? It challenges the worldview, economic models and consumption habits of an entire civilisation. It is no surprise that not only the implications but the core science are contested by people with something to lose and by politicians with votes to win and defend.

Taking the science seriously has vast implications for production and consumption; changes of great magnitude need consent, especially in democracies. The price tag for action is huge, dwarfed only by the probable price tag (if it is payable at all) for failing to act in time. It is essential to win consent and build consensus, and given the implications of action plans, there needs to be as open and frank a debate as possible. The in-group peer review process is not enough, given what is at stake. Sceptics need to be won over or defeated in open debate and assessment of evidence, not ignored or sidelined.

4) Those in the 'climate consensus' need to be far more sensitive to social and cultural context

Climate science is part traditional 'solid' experimental work and part 'post-normal science', as described by the philosophers of science Jerry Ravetz and Silvio Funtowitz two decades ago: that is, science that is intrinsically bound up with uncertainties, modelling, scenarios, implications for values, and assumptions about how human systems will respond and act.



Scientists need to get better at acknowledging this and facing the implications for how their work and its meaning are communicated. Climatologist Mike Hulme is a leading proponent of this view and his recent book *Why We Disagree About Climate Change* (Cambridge, 2009) is essential reading on the cultural and social dimensions of climate science.

One important factor in the current situation is the legacy of the political, economic and social liberalism of the past 50 years in the West. Deference to authority has greatly reduced as people have become more affluent, individualistic and autonomous. This has reduced the trust and confidence reported in churches, unions, traditional authority figures of all kinds ; and science is not immune, especially when its findings and discussions fail to provide the clear-cut results many people associate with 'science' - as with exasperated media and public responses to what are depicted as ever-changing results and prescriptions about nutrition.

In conditions of low trust, as we find in much of the democratic West, scientists must expect the same kind of cynical scrutiny from the mass media that other authorities receive, all the more so given that climate science leads to unwelcome messages for so many economic interests.

To counter this cynical scrutiny, scientists need to understand the social and cultural environment in which they operate, be open and honest about their own values, and face up to the challenge of doing not just 'normal' but contested 'post-normal' science.

Ian Christie, December 2009

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