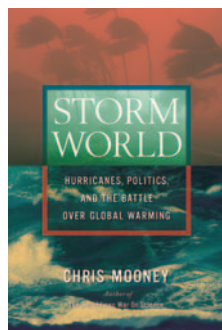


Tempestuous times



Alexandra Witze

Is there scientific evidence of the link between climate change and hurricanes?

STORM WORLD: HURRICANES, POLITICS AND THE BATTLE OVER GLOBAL WARMING

By Chris Mooney

Harcourt: 2007. 400 pp. \$26.00

In April, the journal *Science* published an opinion piece arguing that scientists need to be more effective at ‘framing’ their arguments for different audiences if they hope to have a real impact on policy or society (*Science* 316, 56; 2007). Its authors — communications professor Matt Nisbet and writer Chris Mooney, both of Washington DC — reasoned that on topical issues of importance to society, such as climate change, the average reader does not form an opinion by weighing up the evidence from different sources, but instead uses predisposed values to screen their choices accordingly. As such, public understanding of science is often framed by subjective interpretations of information. The piece triggered a firestorm of argument, with most of the dispute boiling down to cynicism over whether such ‘framing’ constituted anything more than simply placing spin on an idea.

But the issue of framing rhetoric with experience or expectation may well rebound on one of the authors of the *Science* piece now. Mooney, who is the Washington correspondent for *Seed* magazine, is perhaps best known for his 2005 book *The Republican War on Science*, which enumerated multiple failings of the US Republican Party — the Grand Old Party — and its dealings with scientific topics. The book eloquently captured the mood of many in the US scientific establishment at the time, when numerous researchers were speaking out about the perceived manipulation of science by the Bush administration and its cronies.

The Republican War on Science was, in fact, so successful that anything Mooney now does will doubtless be measured by its standard. His latest effort, a book on hurricanes, will, in essence, be viewed by many through the lens of his earlier work on the politicization of science.

Throw in the fact that Mooney is from New Orleans, and one might well expect a certain outcome: a doomsday exhortation of Republicans for their ineptness in dealing with hurricane Katrina, and of scientists for not getting their message across to the public more convincingly.

That assertion would be wrong. In place of a political diatribe, Mooney has written a straightforward and very serviceable account of the study of hurricanes and whether their intensity, frequency or other characteristics are changing due to global warming. *Storm World* reads, in fact, like a story any other qualified science journalist would write about the topic. Yes, it opens with the lingering devastation of the New Orleans house of Mooney’s mother, and there is the occasional glimmer of political tension — such as when NASA’s Jim Hansen accuses the Bush administration of muzzling his statements over global warming. Yet those elements never dominate the book.

Instead, *Storm World* relies on the good old-fashioned components of science writing: a dose of history, some colourful characters, and a clash of viewpoints as the scientific process evolves. The first third of the book is devoted to a history of hurricane research. This grounding is useful in setting up the debates that follow. Mooney traces the evolution of the players from early observation-driven meteorologists who try to tackle the dynamics of hurricane formation, to later theoreticians who invoke equations of wind speed and heat transfer. Interestingly, one of the tensions he sets up is between Herbie Riehl — one of the great early hurricane observers, who helped pioneer the notion of flying instrument-laden aircraft into storms — and the MIT theoretician Jule Charney, who quantified the processes through which hurricanes form and gain their strength.

Riehl and Charney provide a fitting historical parallel for the two main protagonists who feature in the bulk of Mooney’s tale: Colorado State University hurricane forecaster William Gray, and MIT physicist Kerry Emanuel. Gray, whose main role in life these days seems to be as a global-warming sceptic, was Riehl’s student. Emanuel, who probably knows more about tropical cyclone physics than anyone on the planet, was a student of Charney. The real meat of *Storm World* is devoted to the ferocious Atlantic hurricane seasons of 2004, 2005 and 2006. These years saw record numbers of storms, and bore witness to unprecedented infighting between various groups of hurricane researchers. The set-up of Emanuel versus Gray is a bit artificial, but provides a convenient backdrop for the ensuing tense developments. Emanuel is the author of a key paper (*Nature* 436, 686–688; 2005) positing that hurricanes have grown more intense in recent decades because of rising sea-surface temperatures. Gray is the self-appointed ‘debunker’ who used to wind Emanuel up at public symposia — until the relationship between the two deteriorated to the point that they no longer appeared at the same events.

Mooney fleshes out the debate with other characters, such as Gray’s former student Greg Holland, who as a young Australian forecaster watched Cyclone Tracy destroy the city of Darwin. Once sceptical of the link between hurricanes and global warming, Holland has in recent years become a convert, in part because of the work by his Australian friend Peter Webster and colleagues (*Science* 309, 1844–1846; 2005). Mooney accurately sketches some of the key moments of tension in the hurricane debate, such as the 2006 conference in Monterey, California, that featured Webster and Holland taking turns to bombard Gray with questions on

his presentation. To add a little more fuel to the fire, there's Gray's former student Chris Landsea, who argues that the historical record of Atlantic hurricanes is too patchy to make any definitive conclusions about trends in intensity or frequency of storms. Mooney doesn't miss a detail, down to the little hurricane spirals that replace flowers in Landsea's favoured Hawaiian-style shirts.

Still, Mooney is just a bit too much in thrall of Gray, a cranky and colourful personality with time to spare for visiting journalists. But by the end, he has accurately painted Gray as increasingly isolated from his fellow scientists, and

for good reason. But one occasionally wishes for a little less Gray and a little more of the other key players — such as Tom Knutson of the Geophysical Fluid Dynamics Laboratory in Princeton, New Jersey, a hurricane researcher who has reportedly experienced pressure to play down his findings. One also wishes for a lengthier discussion of the global picture of tropical cyclone formation; Mooney's blog, *The Intersection*, (scienceblogs.com/intersection) often contains fascinating tidbits about current cyclones that are little-mentioned in Western media. *Storm World* could have used more of this international

flair. In particular, the modelling studies of US forecasters are discussed at length, whereas results from the United Kingdom and Japan get little mention.

Despite such minor quibbles, *Storm World* is an entertaining and accurate account of research in progress — warts and all. Just don't come to it expecting another *Republican War on Science*. Read it as a straight tale of science, and enjoy the ringside view of a significant debate that continues to unfold today.

Alexandra Witze is Nature's chief of correspondents for America.

Going in the right direction



Chris Goodall

Could reducing your carbon footprint be both fun and profitable?

CLIMATE CHANGE BEGINS AT HOME: LIFE ON THE TWO-WAY STREET OF GLOBAL WARMING

By Dave Reay

Macmillan: 2006. 224 pp. £8.99

In most industrial countries the public has very limited knowledge of the causes and consequences of climate change. In the UK, for example, over half the population questioned in a recent survey thought that the main benefit from tackling climate change would be a 'cleaner atmosphere', appearing to confuse global warming with the causes of smog formation. The pollsters MORI recently reported (in "Tipping Point or Turning Point"; <http://www.ipsos-mori.com/publications/srireports/climatechange.shtml>) that "the public largely consider climate change to be a problem for the future". But we shouldn't be too pessimistic. Whether or not they understand the difference between the troposphere and the stratosphere, increasing numbers of people recognize that climate change is happening and humankind needs to react. The leap to accepting personal responsibility and taking action, however, remains an obstacle. Most people still assume that the government

should be the instigator of action, followed by large corporations. Every one of the increasing numbers of research surveys into green attitudes shows confusion and a lack of knowledge of how individual actions can affect emissions, combined with a rising, though still tiny, level of willingness to take painful personal action.

Dave Reay's book has an interesting approach to dealing with poor understanding of climate change issues. He gives us the tools to become more carbon literate and tries to encourage us into a view that tackling personal emissions can be both profitable and fun. This book is aimed squarely at those non-scientific readers with a nagging concern that climate change is happening and that current Western lifestyles, with their frightening reliance on fossil energy, are not generating improved happiness.

Reay's tactic is to invent a family in the southern USA that lives the typically

prosperous middle-class lifestyle of modern Americans. Energy inefficient cars are combined with long commuting distances. The house is loaded with appliances that take increasing amounts of electricity to run, or just to keep in passive standby. Heating and air conditioning are prodigious users of fossil energy. He shows how the carbon footprint of this family group is built up — which lifestyle decisions matter and which have little relevance. Like the people in today's British opinion polls, this family initially thinks that recycling domestic rubbish is more important to climate change than the energy use from personal travel or home electricity. Reay gradually educates them into realizing what really matters.

Reay's tone is gentle, humane and funny and he wears his learning lightly. He deftly switches between the main categories of energy use, both the traditional villains of cars, air travel, home heating and electric

appliances and the new demons of office energy consumption and the still largely invisible impact of modern agriculture on emissions, a subject on which Reay has published widely in scientific journals. This is not a book that simply offers the top 100 tips for reducing your footprint, nor is it a dry listing of the energy consumption of the main electric appliances. It is a wise and thoughtful look at how modern lifestyle has brought with it a huge inflation in the need for energy use. If we are to retain our social status we need to show our wealth by consuming increasing amounts of energy. Work life requires us to travel more to maintain contact with colleagues. Even socializing means flitting in our cars from place to place with little thought for the consequences for energy use. Reay's American family members gradually begin to see how their lifestyle affects their carbon emissions.

Then Reay moves on to suggest that we would all be happier if we consumed less

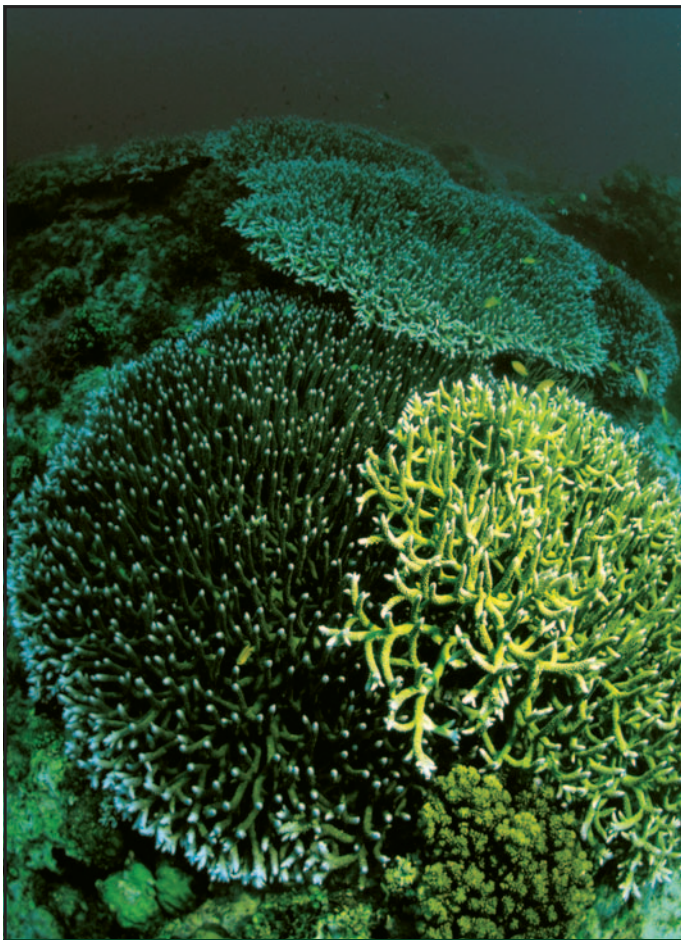
and took better care of the atmosphere. His pleasant and well-meaning family don't really want to spend money to keep up with the social demands placed upon them. Neither do they enjoy travelling long distances or shopping in overcrowded supermarkets. You don't always need to attend international conferences, he says, and is honest enough to note that climate change scientists are usually far from innocent in this respect. We're told it's fun and profitable to work to reduce your energy use.

I'm not sure I really believe that Reay holds this view himself. Hidden among the spirited and fast-paced paragraphs of this book are little hints suggesting that he knows deliberate withdrawal from participating in conventional materialist society is difficult and painful. Every ten minutes on the TV screen are advertisements for desirable foreign holidays, gorgeous new electric appliances and sleek motor cars. For a modern family

to adopt a monastic lifestyle is vanishingly rare. I think deep down Dave Reay knows that our competitive fast-paced material economy holds us in addictive thrall.

Of course publishers and readers don't want books that exude a pessimistic sense that the world is going to have to really change to meet the global warming emergency. They hope for texts that say small adjustments are going to be enough. Nevertheless, the next time he writes a book for a general audience, perhaps Dave Reay should say that prosperous societies need sharp redirection of the trends in our agriculture, travel and domestic energy use as well as a huge reduction in material consumption. I finished his current book thinking that this is what he really wants to say.

Chris Goodall is the author of How to Live a Low-Carbon Life: the Individual's Guide to Stopping Climate Change.



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