

## THE GREENHOUSE EFFECT AND THE U.S. SUMMER OF 1988: CAUSE AND EFFECT OR A MEDIA EVENT?

*An Editorial*

I suspect that more than a few readers of *Climatic Change* shared with me the burden of responding to scores of press, politician, and business group inquiries about the hypothesized connections among the heat, drought, and fires in the United States this summer and the long-anticipated greenhouse effect. I am one who has long argued for the plausibility of the belief that human emissions of carbon dioxide and other trace greenhouse gases could lead to significant, probably unprecedented climatic change by the middle of the next century. Thus, it was with some pleasure that I observed this viewpoint passing from the ivy-covered halls of academe and the concrete and glass of government offices into the popular consciousness. But at the same time, the way it happened, in the United States at least, allowed only a small (and perhaps only fleeting) measure of pleasure.

By July, 1988, there were cover stories in news weeklies, lead articles on broadcast news programs, and hundreds of newspaper and magazine writeups appearing on the presumed connection between the heat wave and the greenhouse effect. With a few exceptions, there was very little scientific content in most of the stories. Instead, dramatic visuals of damaged crops, dried up rivers, sweltering cities, record hurricane pressures, or burning forests dominated the coverage. The greenhouse effect was, typically, explained by a 10-second colorful visual showing downward yellow arrows of sunlight reaching the Earth's surface but fewer upward red arrows escaping to space. Better stories pointed out that there was some debate as to whether anyone could ascribe the weather events of one year to a global trend. After all, the drought in May and June was a result of an out-of-position jet stream, which diverted storms up into Canada rather than across the mid-United States. (My NCAR colleague, Kevin Trenberth, believes this circulation anomaly may have been forced by the unusually cold sea surface temperature anomalies in the equatorial Pacific – a 'reverse El Nino', in effect.) Some reporters even questioned whether the approximately 0.7 °C trend over the past century reported by groups at a climatic research unit in East Anglia and Goddard Institute for Space Studies in New York represented 'proof' that the 25% increase in CO<sub>2</sub> over the same period had finally been detected in the climatic record. But most coverage, especially on television, had little discussion that reflected the consensus of views on what is well accepted and what is deemed speculative by most researchers. Mostly, the association of local extreme heat and drought with global warming took on a growing credibility simply from its repeated assertion. Therefore, my excitement at the long-overdue public attention the greenhouse affect was finally receiving was tempered substantially by a fear that should next summer be anomalously cold and wet – by no means a remote possibility – not only could we lose the momentum of public interest, but some of our credibility as well.

How then, should we scientists approach public discussion of a complicated issue such as the detection of a greenhouse effect signal in a noisy climatic record? In essence, we face what I like to characterize as a 'double ethical bind'. While we do not have a formal Hippocratic path, most scientists feel a loyalty to the scientific method: test and retest ideas, constantly being vigilant for false hypotheses. This loyalty translates into public comments filled with caveats, if's, and's, and but's, and other clear statements of the nature of technical uncertainties. On the other hand (there always is one, of course), most

of us also wish to see the world a better place, (e.g., to mitigate harm from potentially unprecedented rates of climatic change). That means trying to advance our own world view. That has two ethical requirements. First, admitting openly what our value system is; that is, what our world view amounts to. Second, we should invest effort in trying to promote it. But promoting concern over the negative connotations of the greenhouse effect in this media age usually means offering few caveats and uncertainties – at least, if you want media coverage. Twenty-second spots on national television programs may reach 50 million people in the U.S., but simply do not afford time for hedged statements; and if one is going to influence the public, one simply has to get into the media.

The double ethical bind, then, is groping to find the balance between being effective and being honest. I have no formula to offer on how to define that balance, since this issue, like all ethical questions, involves uneasy trade-offs among worthy but conflicting values. Each of us will simply have to experiment to try to find phrases and metaphors that are both familiar and comprehensible to the public and politicians, but that do not do too much damage to the complex nature of evolving scientific knowledge. In my case, for example, for the past couple of years I have used the easily understood metaphor of games of chance to explain climate signal detection. That is, think of the summer's climate in some region as the outcome of a gigantic set of nature's 'climatic dice', not a pair with 12 faces, but in this metaphor, say, 120. These 'faces' include wet and dry months, warm and cold, etc. The odds of getting any particular face should be based upon a long and reliable record of the climatic statistics of that region. Of course, those odds will only be valid in the future if the causes of past climate variability will be identical to those in the future. What those of us who have been concerned about the rapid rate of greenhouse gas buildup have been arguing over the past decade or so is that human alteration of the composition of the atmosphere is changing the climate so that one cannot be sure that the statistics of the past can automatically be applied in the future. We use tools such as mathematical models to give us some quantitative estimates of both changes in the mean and changes in variability. The dice metaphor I have been using simply suggests that what the greenhouse effect is expected to do is to 'erase' some 'cold faces' on the climatic dice, and replace them with more warm ones (e.g., see Mearns, Katz, and Schneider, 1984 and Parry and Carter, 1985). Similarly, if some model's projections of midcontinental dry zones prove true, then perhaps some 'wet faces' will be replaced with more dry ones. The reason I like this metaphor is that it says that in any one event, such as the U.S. climate anomaly of 1988, it is impossible to know whether it is simply an extreme fluctuation or evidence of loaded dice. The metaphor makes it apparent that one has to wait awhile to be certain a change in the odds has occurred. But, of course, there is a risk of waiting for more data, since we would then have to adapt to a much larger dose of climatic change than if we were to attempt to prevent some greenhouse emissions now. This dilemma is at the root of the debate between those who feel the evidence is strong enough already to demand policy actions and those who feel we need to resolve more uncertainties before acting. Of course, these are both *value* judgements, not scientifically testable hypotheses.

Many scientists are uncomfortable having to search for familiar metaphors and jargon-free language that both convey the seriousness of their feelings about a complicated problem such as the greenhouse effect and at the same time express their appropriate scientific skepticism based on their knowledge of the uncertainties. But simply refusing to confront this double ethical bind personally will not make it go away. Rather, those of you who turn away from attempts to communicate honestly and effectively in public

because it is not familiar or comfortable, are simply leaving the task to others – not all of whom will express your science in a way that you might approve of. In essence, if you refuse to try, then you partially have yourself to blame if you don't like the overall way our science is being communicated.

As always, I welcome correspondences on the views expressed in this editorial, as well as any practical suggestions for alternative metaphors or appropriate language that can help to communicate the nature of the climate sciences within the boundary conditions that the media impose: succinct explanations and familiar images.

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## References

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