# Preface

This revised edition of the National Safety Council's Environmental Health Center's 1994 *Reporting on Climate Change: Understanding the Science* seeks to put into context for the news media some of the most important emerging science in a field where emerging new scientific findings occur with regularity.

Reporters' bookshelves could literally sag with the peer-reviewed scientific findings on issues related to global climate change. This guidebook seeks to assure that they don't and, equally importantly, to assure that newspaper and magazine readers' tired eyes and television and radio audiences' weary senses aren't battered and abused with just more "on the one hand, this, and on the other hand, that" or "he said/she said" journalism.

As timely as it seemed when first published, the truth is that EHC's 1994 *Reporting on Climate Change* actually set out to accomplish just the relatively modest goal of providing reporters a good readable update on the best peer-reviewed science to that point. It turned out that the Intergovernmental Panel on Climate Change late that year issued its seminal findings and conclusions up through that year.

This second edition closes that chapter. Close readers will find that this update in many ways resembles the earlier edition, and they would not be wrong. The basic atmospheric chemistry so fundamental to understanding the nature of this beast, after all, does not change over time, so much of this edition itself remains unchanged.

What has changed is that this edition includes the most recent available trends and numbers and a review of the 1995 IPCC Assessment report. What has changed is that this edition walks the reader not only to the point ***to*** the 1995 IPCC Assessment report, but rather ***through*** that report.

What has ***not*** changed from the first edition is the continuing focus in this update on "just" the science of global climate change, nor its reliance on the peer-reviewed findings of the IPCC. Just as with the first edition more than five years ago, there is no question that economic, policy, and political considerations play, and will and should play, an important role in shaping what directions our society and others will take in addressing the risks posed by global climate change. Journalistically responsible stories on the issue will deal with each of those factors, and others too, in proportions.

But this guide does not. Instead, it focuses on "only" the science. One thought from the first edition's preface bears repeating here: "It is a *big* 'only' indeed."

As the story did when the first *Reporting on Climate Change* went to the news media in the fall of 1994, the climate change or "global warming" story continues to be one of the most compelling and most demanding in the field of environmental journalism. Finding local hooks and angles remains a challenge. Separating the scientific "wheat" and "chaff" will never be easy, but if this update helps reporters climb that mountain, it will have accomplished its goal.

One last thought. Just as it's unlikely that any of us have heard "the last word" on the global climate change issue, I suspect it's equally likely that reporters can look forward to further updates when and as the Intergovernmental Panel on Climate Change or any successor prestigious international body, provides new advances in the field. That will be the tip for reporters to look for, and expect, a third update of this guide, for which EHC Senior Writer Joseph A. Davis, Ph.D., deserves the credit as the principal author.

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# Acknowledgement

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EHC appreciates the management and project support provided it by both Mr. David Bader of DOE and by Ms. Daphne Gemmill of NOAA. Each provided the kind of "hands off" assistance — yet at the same time the kind of sound technical guidance — most critical to EHC's meeting the needs of print and broadcast journalists, for whom this guide, again like its predecessor, is primarily intended.

Given the nature of this edition — building on the sound scientific basis of its predecessor — EHC was able to benefit in this guide from the untiring quality assurance editorial reviews provided by an independent technical review committee for the first edition. The technical reviews those individuals provided for the November 1994 edition in most ways carry through also to this guide in that much of the underlying basic science remains unchanged. Those individuals and their affiliations are listed here for identification purposes, and the listing does not necessarily imply their full support for or endorsement of specific editorial components of this guide. Rather, it reflects EHC's continuing indebtedness and appreciation to them for their earlier oversight roles.

Those Technical Committee Members: Anthony J. Broccoli, NOAA, Geophysical Fluid Dynamics Laboratory; Robert Molinari, Ph.D., Director, Physical Oceanography Division, Atlantic Oceanographic and Meteorological Laboratory, NOAA; Jonathan Overpeck, Ph.D., NOAA Paleoclimatology Program, National Environment Satellite Data Information Service; Claire L. Parkinson, NASA Goddard Space Flight Center; Michael H. Proffitt, Ph.D., NOAA, Aeronomy Laboratory and CIRES, University of Colorado; David Rodenhuis, Ph.D., NOAA, National Weather Service; Kevin E. Trenberth, Ph.D., Climate and Global Dynamics Division, National Center for Atmospheric Research.

Reporting on Climate Change, 2000, is available at EHC's Internet Web home page in portable document file (pdf) format at the following address: http://www.nsc.org/ehc/guidebks/climtoc.htm.

## Intergovernmental Panel on Climate Change

Spend much time poring through the climate change technical literature, and you're certain soon to come across reference to the Intergovernmental Panel on Climate Change, the IPCC.

We did, and this reporter's guide owes much to the extensive deliberations of that authoritative group.

Established by the World Meteorological Organization and the United Nations Environment Programme in 1988, IPCC over the following two years brought together hundreds of the world's leading scientists representing dozens of technical fields. They served as contributors, as reviewers, as a quality assurance "sounding board."

There is of course no "final word" in science, certainly not in a field as dynamic as atmospheric chemistry and one as sweeping as climate change. The 1990 and 1995 IPCC Assessment reports which proved so invaluable in writing this guide are not the "final word." They are just the single most comprehensive and most authoritative body of work done yet on this subject, and reporters will do well to use it as a primary source for their own research. An update is expected by the year 2001.

IPCC's *Climate Change 1995: The Science of Climate Change* and other IPCC reports are available from the Press Syndicate of the University of Cambridge, 40 West 20th Street, New York, NY 10011-4211.

# Introduction

There is something uniquely different about this guide for reporters who work the environment beat ... and for their editors.

As with other stories on this already demanding beat, coverage of climate change demands all the usual skills common to vigorous, independent, fair-minded journalism: curiosity, persistence, verification, and a healthy skepticism about the absolutists, "true believers," on any side.

True to tradition, it also places a premium on avoiding great leaps of faith, extrapolating from one localized certainty or trend to some global plausibility or irreversible pattern.

But unlike most other environmental stories, this story may not see resolution — at least not scientific "certainty" — in the lifetime of many of its tellers, listeners, or readers.

The demands of tracking and understanding current and ongoing events played out on a timeless, unpredictable geologic stage pose some of journalism's most daunting communications challenges.

Nothing changes more rapidly, nor more often, than the weather, it is true. Climate is another matter. The perplexity of how — and how often — it changes globally, and with what localized effects, places a premium on understanding and communicating the importance of geologic time, scale, and certainty.

Reporters and their editors are faced with the difficult prospect of sometimes having to localize news drawn from global observations, constructing possibilities in Albuquerque, Atlanta, or Anaheim from drought or flood events and patterns in the Mojave Desert, the Great Plains, or even the Arctic Ocean. It is a process that calls for keen, patient yet inquisitive minds.

Reporters telling the story must be able to see well beyond today's crises and must resist the temptation to cast today's intriguing possibilities as tomorrow's inescapable facts. They must succeed where even some of the world's foremost scientists have failed, by reducing the often confounding language of uncertain science into lay terms that readers, viewers, and listeners can understand and use.

Reporting on climate change requires all those skills and techniques ... and more, much more. It challenges its practitioners to put their stories where their principles and ethics are — above reproach.

Beyond all, reporters must be patient and persistent. The stories written today, tomorrow, and next week in the end may be the most important done in improving public understanding of the issues. But such an assessment may have to wait years, perhaps decades, for the issues

themselves — and the knowledge of them — to mature.

Fact is, you may not know until 2005, 2010, 2015, or later just how accurate yesterday's headline or tomorrow's lead graph actually is. And your editor won't know either.

Along with the elusive "scientific certainty," the onset of the impacts themselves may be years away But that does not mean the immediacy of the issue is far off and remote to your audiences.

Far from it.

Decisions made yesterday, today, tomorrow will contribute, for better or worse, to the climate changes many scientists think are inevitable and others insist are only theoretical. Helping your audience understand that connection is part of the challenge: Actions today to thwart potentially adverse — and certainly unknowable — impacts years from now. Actions to be taken, or perhaps not taken, in an absence of certainty and in the context of best judgments.

But there's more too, for decisions made now in the context of protecting Earth's resources are not without their costs, both in terms of financial outlays and in terms of opportunities foregone.

Scientific considerations and judgments — scientific certainties and uncertainties and estimates and informed hunches — all will play an important role in determining how global societies collectively or individually address the issue of climate change. But in the end, science certainly will be just one factor in their policymaking decisions, surely not the sole factor driving such decision-making.

Economics and politics certainly will, and indeed should and must, have their say in driving that decision-making.

But those, however important on their own, go beyond the scope here. This guide focuses on the science of climate change — what is known, what is not known, and what is uncertain. The science provides a frame of reference for the politics and economics of the issue which, for now, will have to await a subsequent EHC reporter's guide.

Climate change. It is likely to pose environmental journalism's greatest challenges and satisfactions.

It's a great and ongoing story, with all the elements of any other good story. Go for it.

# Facts & Myths

This is a pop quiz. No, don't put your books away. It's an open book test. We started this section as "Facts and Myths about Climate Change." But the more we discussed it, the less confident we became about which are facts and which are myths.

So think of it as a multiple-choice answer: fact, myth, or possibly something else — a question too complex for a simple answer, on which there may be a range of opinions.

You will find answers, or at least insights, to each of these questions in this guide. Or starting points for finding your own answers. On the answer page, we indicate whether we called it fact or myth (or opinion) and it is linked to the page in the book on which the question is addressed.

## Questions

1. Global warming on the scale many scientists anticipate would mean death for billions and potentially the end of the human race. Fact ❒ Myth ❒ Opinion ❒
2. Global mean temperatures calculated for the last decade have been as high or higher than at any time since modern instruments began consistently recording temperature (the late 1800s). The increase from the longer-term average is still within the range of normal variation. Fact ❒ Myth ❒ Opinion ❒
3. There is nothing we can do about global warming. It is too late. Fact ❒ Myth ❒ Opinion ❒
4. Humans are the only species ever to have drastically changed the atmosphere on a global scale. Fact ❒ Myth ❒ Opinion ❒
5. If humans had not interfered with nature by building industrial societies, global climate would not have changed significantly. Fact ❒ Myth ❒ Opinion ❒
6. Most climate change occurs on time scales far longer than a human lifetime. Global change forced by human activity could cause it to occur faster. Fact ❒ Myth ❒ Opinion ❒
7. Climate had been changing dramatically and often before humans evolved on Earth. Fact ❒ Myth ❒ Opinion ❒
8. Climate has always been about the same as it is now. Fact ❒ Myth ❒ Opinion ❒
9. The global warming that scientists anticipate from human activity will be unprecedented in the history of Earth. Fact ❒ Myth ❒ Opinion ❒
10. The existence of a greenhouse effect is controversial among scientists. Fact ❒ Myth ❒ Opinion ❒
11. The greenhouse effect is now being amplified by increased

concentrations of certain gases in the atmosphere as a result of human emissions. Fact ❒ Myth ❒ Opinion ❒

12. Carbon dioxide is not the only greenhouse gas put into the atmosphere by human activity. Others are methane, nitrous oxide, chlorofluorocarbons (CFCs), and ozone. Fact ❒ Myth ❒ Opinion ❒
13. A "scientific consensus" exists on most important scientific issues related to global change. Fact ❒ Myth ❒ Opinion ❒
14. Scientists are generally quite confident that there has been an increase in concentrations of greenhouse gases, especially $CO_2$, because they can measure them. Fact ❒ Myth ❒ Opinion ❒
15. Greenhouse gas concentrations that have taken decades or centuries to increase will also take decades or centuries to reduce. Fact ❒ Myth ❒ Opinion ❒
16. We know that the "greenhouse effect" is unquestionably a real thing. It follows that there is little uncertainty about the prospect for anthropogenic greenhouse warming. Fact ❒ Myth ❒ Opinion ❒
17. When glaciers and ice sheets melt, much of the melt water goes into the oceans. The melting has caused sea levels to rise hundreds of feet at the ends of successive ice ages. Since the last ice age began to end some 20,000 years ago, ocean levels have risen more than 300 feet. Fact ❒ Myth ❒ Opinion ❒
18. The seas are rising — and rising faster today than before the Industrial Revolution. Fact ❒ Myth ❒ Opinion ❒
19. Scientists are predicting "Palm Trees on the Potomac" [a *Washington Post* headline] within the next 100 years. Monkeys will throw coconuts at passing legislators and lobbyists. Fact ❒ Myth ❒ Opinion ❒
20. We are very certain of the temperature increase in the post-industrial era, because we have precise and consistent temperature measurements worldwide since 1850. Fact ❒ Myth ❒ Opinion ❒
21. We know that the increase in Earth's average temperature since the industrial revolution has been caused by gases humans have spewed out of smokestacks and exhaust pipes. Fact ❒ Myth ❒ Opinion ❒
22. The world has warmed since the beginning of the industrial era. Fact ❒ Myth ❒ Opinion ❒
23. If humans change the climate too drastically, Earth itself (or life on the planet) could be destroyed. Fact ❒ Myth ❒ Opinion ❒
24. It is possible that there could be a "runaway greenhouse effect" on Earth as a result of current human activity. Fact ❒ Myth ❒ Opinion ❒
25. Climate models get less reliable in depicting potential change as they zoom in on regional and local scales. Fact ❒ Myth ❒ Opinion ❒
26. Ending the use of CFCs in aerosol sprays in the United States did not

"solve" the ozone depletion problem. Fact ❒ Myth ❒ Opinion ❒

27. The U.S. Environmental Protection Agency has estimated that depletion of the ozone layer would increase three kinds of skin cancer: basal and squamous cell cancers (which together affect about 500,000 people annually in the United States) and malignant melanoma (which affects about 25,000 people annually, results in 5,000 deaths, and accounts for about 65% of all skin cancer deaths). Fact ❒ Myth ❒ Opinion ❒
28. Scientists are objective. Their feelings and political views rarely or never influence their research or conclusions. Fact ❒ Myth ❒ Opinion ❒
29. One thing science can always give you is certainty. Fact ❒ Myth ❒ Opinion ❒
30. One way to arrive at "scientific truth" is to conduct an opinion poll of scientists. Fact ❒ Myth ❒ Opinion ❒
31. An important question to ask a science source is: "How do you know that?" Fact ❒ Myth ❒ Opinion ❒
32. Computer models are theories, not facts. Models can tell us only the implications of what we think we already know about how natural climate processes work. They, too, must be verified. Fact ❒ Myth ❒ Opinion ❒
33. Science adopts the same basic principle journalists do: verify everything. Fact ❒ Myth ❒ Opinion ❒
34. Computer models can compensate for gaps in our basic understanding of how the physical processes in the climate system work. Fact ❒ Myth ❒ Opinion ❒
35. When a climatologist uses the specialized scientific term "plausible scenario," that means the thing he/she is talking about is fairly certain to happen. Fact ❒ Myth ❒ Opinion ❒
36. Climate change has repeatedly helped destroy whole civilizations, archeological evidence suggests. Fact ❒ Myth ❒ Opinion ❒

1. Myth, p.9
2. Fact, p.9
3. Myth, p.14
4. Myth, p.15
5. Myth, p.15
6. Fact, p.15
7. Fact, p.15
8. Myth, pp.15-16
9. Myth, p.15
10. Myth, p.19
11. Fact, p.19
12. Fact, Chap. 3
13. Opinion, pp.19, 41
14. Fact, p.25
15. Fact, p.30
16. Myth, p.36
17. Fact, p.38
18. Myth, p.39
19. Myth, p.42
20. Myth, pp.46, 96
21. Opinion, pp.58, Chap. 8
22. Opinion, p. 9
23. Myth, pp.50-51
24. Myth, pp.50-51
25. Fact, p.44
26. Fact, p. 63
27. Fact, p.74
28. Myth, pp.81-88
29. Myth, Chap. 6
30. Opinion, Chap. 6
31. Opinion, p.82
32. Fact, p.91
33. Opinion, p.91
34. Myth, p.95
35. Myth, p.97
36. Fact, see book by Bryson, in Appendix B