

Climate Change 1 — What is Climate Change?

Climate change may be the most important environmental issue facing the world in the first decade of the 21st Century. It is a complex and hotly debated issue. In the following white papers I will try to clarify the topic, present what is known, and draw out the implications for policy makers.ⁱ

Climate refers to weather patterns. There are many different qualities that describe climate, such as temperature, precipitation, type of precipitation, wind, humidity, snow cover, snow persistence, growing season, etc. For each of these qualities, we are interested not only in their average values, but also in the ways they vary. With regard to temperature, for instance, the average yearly temperature is important, but so are the difference between the average temperature in summer and winter, the day-to-day temperature variations, the frequency of temperature extremes, and the duration of temperature extremes when they do occur.ⁱⁱ

Weather is what happens each day. *Global climate change* refers to long-term changes in global weather patterns. The changes manifest variably in different regions, but they are the result of the same underlying causes. It is important to be particularly clear on this point. Weather is quite variable year-to-year. Climate change is not about whether it was warm last summer or this winter. It is about whether it has been getting warmer the last several decades. Because global average temperature is increasing, the name *global warming* was initially used to describe these changes. However, not all regions of the world are expected to warm similarly, and the term has been replaced with *global climate change*.ⁱⁱⁱ

Climate is always changing, however. We all know that tens of thousands of years ago, the world was wrapped in the embrace of an ice age, and that much of North America was covered by sheets of ice thousands of feet thick.ⁱⁱⁱⁱ The change from then to now represents a very substantial climate change. Similarly, most of us have heard of the El Niño phenomena, in which a change in weather patterns over the South Pacific affects weather worldwide for a year or two.^{iv} Although these changes are significant and important, the discussion of global climate change is a discussion of change that result from human activities, principally the release of greenhouse gasses into the atmosphere. It is a discussion over whether humans have such an effect, over what activities contribute to such an effect, over how serious the change is, and over what to do about it.

The discussion is important because we have adapted to current conditions, and have built our civilization to fit them. If they change, it is likely to have serious consequences. However, the charged atmosphere surrounding this issue bombards the policy-maker on the one side with apocalyptic hysteria (the media love catastrophes), and on the other with denial that borders on delusion.

We will explore these topics in the following white papers, trying to find a simple, but not simplistic, understanding of what we do and don't know about climate change.

ⁱ An easy-to-read introduction to climate can be found in the article *Climate*, on Wikipedia., retrieved online 2/10/2008 at <http://en.wikipedia.org/wiki/Climate>. The IPCC report on the physical basis for climate change also contains a discussion of the concept of climate, especially in the first section of the Executive Summary and in Chapter 1. See the note below for the reference to the report.

ⁱⁱ Climate Change 2007 - The Physical Science Basis: Contribution of Working Group I to the Fourth Assessment Report of the IPCC Retrieved online 3/12/2008 at <http://www.ipcc.ch/>.

ⁱⁱⁱ *Ice age*. Wikipedia, http://en.wikipedia.org/wiki/Ice_age.

^{iv} *El Niño*. Wikipedia. Retrieved online 2/10/2008 at http://en.wikipedia.org/wiki/El_Nino.