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Findings of the IPCC Fourth Assessment Report Climate Change Science

After assessing decades of climate data recorded everywhere from the depths of the oceans to tens of miles above Earth's surface, leading scientists from around the world have reported major advances in our understanding of climate change.

Released in February 2007—six years after the prior assessment by the Intergovernmental Panel on Climate Change (IPCC)—the IPCC Fourth Assessment Report's Working Group I Summary for Policymakers synthesizes current scientific understanding of global warming and projects future climate change using the most comprehensive set of well-established global climate models.¹ The Working Group I contribution is the first of three that comprise the full IPCC Fourth Assessment Report, which includes the input of more than 1,200 authors and 2,500 scientific expert reviewers from more than 130 countries. In subsequent reports, Working Group II evaluates "Impacts, Adaptation and Vulnerability" and Working Group III evaluates "Mitigation of Climate Change."²

What the IPCC Means by "Likely"

When the IPCC ascribes a likelihood to a scientific finding, the term used reflects a specific range of certainty as defined by the chart below.

Human Responsibility for Climate Change

The report finds that it is "very likely" that emissions of heat-trapping gases from human activities have caused "most of the observed increase in globally averaged temperatures since the mid-20th century." Evidence that human activities are the major cause of recent climate change is even stronger than in prior assessments.³

Warming Is Unequivocal

The report concludes that it is "unequivocal" that Earth's climate is warming, "as is now evident from observations of increases in global average air and ocean temperatures, widespread melting of snow and ice, and rising global mean sea level."

The report also confirms that the current atmospheric concentration of carbon dioxide and methane, two important heat-trapping gases, "exceeds by far the natural range over the last 650,000 years." Since the dawn of the industrial era, concentrations of both gases have increased at a rate that is "very likely to have been unprecedented in more than 10,000 years."

Additional IPCC Findings on Recent Climate Change

Rising Temperatures

- Eleven of the last 12 years rank among the 12 hottest years on record (since 1850, when sufficient worldwide temperature measurements began).
- Over the last 50 years, "cold days, cold nights, and frost have become less frequent, while hot days, hot nights, and heat waves have become more frequent."

Increasingly Severe Weather (storms, precipitation, drought)

- The intensity of tropical cyclones (hurricanes) in the North Atlantic has increased over the past 30 years, which correlates with increases in tropical sea surface temperatures.
- Storms with heavy precipitation have increased in frequency over most land areas. Between 1900 and 2005, long-term trends show significantly increased precipitation in eastern parts of North and South America, northern Europe, and northern and central Asia.

IPCC Range of Likelihood



