

Climate Change: An Evolution of Understanding

EARLY DEVELOPMENTS:

1824 - Joseph Fourier discovers what was later called the “greenhouse effect.”

1850s - John Tyndall finds water vapor and CO₂ determine variations in Earth’s climate.

1896 - Svante Arrhenius publishes first estimates of future global warming caused by coal combustion.

MODERN SCIENCE EMERGES

1950s - Roger Revelle and Hans Suess show that atmospheric CO₂ has increased from the combustion of fossil fuels.

1960s – Based on the first continuous measurements of carbon dioxide in the atmosphere that he began atop Mauna Loa in Hawaii in 1957, C.D. Keeling finds that atmospheric CO₂ has been steadily increasing.

1979 - Scientific consensus begins to emerge: *CO₂ will lead to significant warming of the Earth.*

1980s - Important scientific developments occur, including 3 biggies:

- Analyses show long-term warming of the earth by 0.4 °C since 1880.
- Ice core dating back 160,000 years is retrieved from Antarctic ice sheet and provides carbon dioxide and temperature records showing high correlations.
- Climate models improve, incorporate ocean heat transport.

1985 - Climate experts call for an international framework to slow warming.

1988 - The Intergovernmental Panel on Climate Change is formed.

1990 - IPCC releases its first assessment.

1991 - Countries begin negotiating the U.N. Framework Convention on Climate Change.

1992 - President George Bush signs the treaty; U.S. Senate ratifies it.

1996 - IPCC’s Second Assessment: “The balance of evidence suggests a *discernable* human influence on global climate.”

2001 - IPCC’s Third Assessment reveals most of the warming observed over the last 50 years is attributable to human activities.

2007 - IPCC's Fourth Assessment shows most of the warming observed since the mid-20th century is very likely due to the observed increase in anthropogenic greenhouse gas concentrations.

2013 - IPCC's Fifth Assessment explains that it's extremely likely that more than half of the observed increase in earth's temperature from 1951 to 2010 was caused by increases in greenhouse gas concentrations and other human activities together.

Footer: This information is based on a congressional testimony written by Michael Oppenheimer of Princeton University.