

CLIMATE CHANGE: CERTAINTIES AND UNCERTAINTIES

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ABSTRACT

Warming of Earth's climate system is unequivocal, and it is generally agreed that the observed increase in global average temperatures since the mid-20th century is due mainly to increased concentrations of greenhouse gases, of which the most important is carbon dioxide. However, despite several decades of intense research, climate sensitivity, the amount by which global mean temperature would be expected to increase in response to a sustained increase in atmospheric CO₂ concentration, remains uncertain to almost a factor of three. This uncertainty has major implications for policymaking, especially with respect to energy. This talk reviews the physical basis of climate change and outlines some of the reasons why quantitatively projecting future climate change in response to future emissions remains such a difficult problem. Despite the uncertainties it is clear that atmospheric carbon dioxide will continue to increase absent major changes in the world's energy economy, that the possible consequences of this increase range from serious to severe to catastrophic, that present scientific understanding is sufficient to permit "no regrets" decision making, and that actions taken (or not taken) today will inevitably affect future generations.