
Executive Summary

This report is produced by the Nongovernmental International Panel on Climate Change (NIPCC), a joint project of three organizations: Center for the Study of Carbon Dioxide and Global Change, Science & Environmental Policy Project, and The Heartland Institute. Three lead authors – Craig D. Idso, Robert M. Carter, and S. Fred Singer – assembled and worked closely with nearly 50 chapter lead authors, contributors, and reviewers from 15 countries. This volume was subjected to the common standards of peer-review.

This work provides the scientific balance that is missing from the overly alarmist reports of the United Nations' Intergovernmental Panel on Climate Change (IPCC), which are highly selective in their review of climate science and controversial with regard to their projections of future climate change. Although the IPCC claims to be unbiased and to have based its assessment on the best available science, we have found this to not be the case. In many instances conclusions have been seriously exaggerated, relevant facts have been distorted, and key scientific studies have been ignored.

In keeping with its “Red Team” mission, NIPCC authors paid special attention to contributions that were either overlooked by the IPCC or that contain data, discussion, or implications arguing against the IPCC's claim that dangerous global warming is resulting, or will result, from human-related greenhouse gas emissions. Most notably, its authors say the IPCC has exaggerated the amount of warming they predict to occur in response to future increases in atmospheric CO₂. Any warming that may occur is likely to be modest and cause no net harm to the global environment or to human well-being.

Key Findings by Chapter

Chapter 1. Global Climate Models and Their Limitations

- Properties inherent in models make dynamic predictability impossible. Without dynamic predictability, other techniques must be used to simulate climate. Such techniques introduce biases of varying magnitude into model projections.
- To have any validity in terms of future projections, GCMs must incorporate not only the many physical processes involved in determining climate, but also all important chemical and biological processes that influence climate over long time periods. Several of these important processes are either missing or inadequately represented in today's state-of-the-art climate models.
- Limitations in computing power frequently result in the inability of models to resolve important climate processes. Low-resolution models fail to capture many important phenomena of regional and lesser scales, such as clouds; downscaling to higher-resolution models introduces boundary interactions that can contaminate the modelling area and propagate error.
- The magnitude of the range of projected responses to a doubling of atmospheric CO₂ by itself establishes that large errors and limitations in the models remain to be corrected.
- Many GCMs fail to account properly for certain “multiplier effects” that may significantly amplify the initial impacts of various biospheric processes.

For example, although the absolute variations associated with some solar-related phenomena are rather small, several multiplier effects may significantly amplify the initial perturbation.

- Major imperfections in the models prevent proper simulation of important elements of the climate system, including pressure, wind, clouds, temperature, precipitation, ocean currents, sea ice, permafrost, etc. Large differences between model predictions and observations frequently exist when comparing these elements or features. In some cases computer models fail to simulate even the correct sign of the observed parameters.
- Although some improvements have been noted in performance between the CMIP3 set of models used in AR4 and the newer CMIP5 models utilized in AR5, many researchers report finding little or no improvement in the CMIP5 model output for several important parameters and features of Earth's climate.

Chapter 2. Forcings and Feedbacks

- Research published in peer-reviewed science journals indicates the model-derived temperature sensitivity of Earth accepted by the IPCC is too large. Negative feedbacks in the climate system reduce that sensitivity to values an order of magnitude smaller.
- Establishing the historic phase relationship between atmospheric carbon dioxide and temperature is a necessary step toward understanding the physical relationship between CO₂ forcing and climate change. When such analyses are conducted, changes in CO₂ are frequently seen to *lag* changes in temperature by several hundred years.
- Many studies reveal a large *uncoupling* of temperature and CO₂ throughout portions of the historical record. Such findings contradict the IPCC's theory that changes in atmospheric CO₂ drive changes in temperature.
- Atmospheric methane observations over the past two decades reside far below the values projected by the IPCC in each of the four *Assessment*

Reports it has released to date. The IPCC's temperature projections, which incorporate this inflated influence, should be revised downward to account for this discrepancy.

- Because agriculture accounts for almost half of nitrous oxide (N₂O) emissions in some countries, there is concern that enhanced plant growth due to CO₂ enrichment might increase the amount and warming effect of this greenhouse gas. But field research shows N₂O emissions will likely fall as CO₂ concentrations and temperatures rise, indicating this is actually another negative climate feedback.
- The IPCC has concluded "the net radiative feedback due to all cloud types is likely positive" (p. 9 of the Summary for Policy Makers, Second Order Draft of AR5, dated October 5, 2012). Contrary to that assessment, several studies indicate the net global effect of cloud feedbacks is a cooling, the magnitude of which may equal or exceed the warming projected from increasing greenhouse gases.
- The IPCC likely underestimates the total cooling effect of aerosols. Studies have found their radiative effect is comparable to or larger than the temperature forcing caused by all the increase in greenhouse gas concentrations recorded since preindustrial times.
- Higher temperatures are known to increase emissions of dimethyl sulfide (DMS) from the world's oceans, which increases the albedo of marine stratus clouds, which has a cooling effect. The IPCC characterizes this chain of events as "a rather weak aerosol-climate feedback at the global scale" (p. 21 of the Technical Summary, Second Order Draft of AR5, dated October 5, 2012), but many studies suggest otherwise.
- Several other important negative forcings and feedbacks exist in nature, about which little is known or acknowledged by the IPCC. Such forcings and feedbacks have been shown by multiple scientific studies to significantly influence Earth's climate to a degree comparable to that of projected anthropogenic-induced global warming.

- The IPCC claims a positive feedback exists between climate and the carbon cycle on century to millennial time scales such that a warming climate will result in a loss of carbon storage. There is no empirical evidence to support such an assertion. Just the opposite appears to be the case, as global carbon uptake doubled over the past half-century.

Chapter 3. Solar Forcing of Climate

- Evidence is accruing that changes in Earth's surface temperature are largely driven by variations in solar activity. Examples of solar-controlled climate change epochs include the Medieval Warm Period, Little Ice Age and Early Twentieth Century (1910–1940) Warm Period.
- The Sun may have contributed as much as 66% of the observed twentieth century warming, and perhaps more.
- Strong empirical correlations have been reported from all around the world between solar variability and climate indices including temperature, precipitation, droughts, floods, streamflow, and monsoons.
- IPCC models do not incorporate important solar factors such as fluctuations in magnetic intensity and overestimate the role of human-related CO₂ forcing.
- The IPCC fails to consider the importance of the demonstrated empirical relationship between solar activity, the ingress of galactic cosmic rays, and the formation of low clouds.
- The respective importance of the Sun and CO₂ in forcing Earth climate remains unresolved; current climate models fail to account for a plethora of known Sun-climate connections.
- The recently quiet Sun and extrapolation of solar cycle patterns into the future suggest a planetary cooling may occur over the next few decades.

Chapter 4. Observations: Temperature Records

- The warming of the late-twentieth-century as well as the cessation of warming that occurred since 1998 fall well within the range of natural climate variability.
- Surface-based temperature histories of the globe contain a significant warming bias introduced by insufficient corrections for the non-greenhouse-gas-induced urban heat island effect. Filtering out urbanization and related land-use effects in the temperature record is a complicated task, and there is solid evidence the methods currently used are inadequate.
- Although all greenhouse models show an increasing warming trend with altitude, peaking around 10 km at roughly two times the surface value, the temperature data from balloons give the opposite result: no increasing warming, but rather a slight cooling with altitude in the tropical zone.
- The IPCC claim of robust evidence of amplified CO₂-induced warming in Earth's polar regions is false, having been invalidated time and again by real-world data.
- Earth's climate has both cooled and warmed independent of its atmospheric CO₂ concentration, revealing the true inability of carbon dioxide to drive climate change throughout the Holocene. Conditions as warm as, or warmer than, the present have persisted across the Holocene for decades and centuries even though the atmosphere's CO₂ concentration remained at values approximately 30% lower than those of today.
- An enormous body of literature clearly demonstrates the IPCC's assessment of the Medieval Climate Anomaly (MCA) is incorrect. The degree of warming and climatic influence during the MCA indeed varied from region to region, and hence its consequences were manifested in a variety of different ways. But that it occurred and was a global phenomenon is certain.

- Computer model simulations have given rise to three claims regarding the influence of global warming on ENSO events: (1) global warming will increase the frequency of ENSO events, (2) global warming will increase the intensity of ENSO events, and (3) weather-related disasters will be exacerbated under El Niño conditions. However, this is generally not what observational data reveal to be the case. In fact, in nearly all historical records it is seen that frequent and strong El Niño activity increases during periods of colder temperatures (e.g., the Little Ice Age) and decreases during warm ones (e.g., Medieval Warm Period, Current Warm Period).
- Tropical mountain glaciers in both South America and Africa have retreated in the past 100 years because of reduced precipitation and increased solar radiation; some glaciers elsewhere also have retreated since the end of the Little Ice Age.
- The data on global glacial history and ice mass balance do not support the claims made by the IPCC that CO₂ emissions are causing most glaciers today to retreat and melt.
- No evidence exists that current changes in Arctic permafrost are other than natural or that methane released by thawing would significantly affect Earth's climate.

Chapter 5. Observations: The Cryosphere

- Satellite and airborne geophysical datasets used to quantify the global ice budget are short and the methods involved in their infancy, but results to date suggest both the Greenland and Antarctic Ice Caps are close to balance.
- Deep ice cores from Antarctica and Greenland show climate change occurs as both major glacial-interglacial cycles and as shorter decadal and centennial events with high rates of warming and cooling, including abrupt temperature steps.
- Observed changes in temperature, snowfall, ice flow speed, glacial extent, and iceberg calving in both Greenland and Antarctica appear to lie within the limits of natural climate variation.
- Global sea-ice cover remains similar in area to that at the start of satellite observations in 1979, with ice shrinkage in the Arctic Ocean since then being offset by growth around Antarctica.
- During the past 25,000 years (late Pleistocene and Holocene) glaciers around the world have fluctuated broadly in concert with changing climate, at times shrinking to positions and volumes smaller than today.
- This fact notwithstanding, mountain glaciers around the world show a wide variety of responses to local climate variation, and do not respond to global temperature change in a simple, uniform way.

- Most of Earth's gas hydrates occur at low saturations and in sediments at such great depths below the seafloor or onshore permafrost that they will barely be affected by warming over even one thousand years.

Chapter 6. Observations: The Hydrosphere and Oceans

The Hydrosphere

- Little evidence exists for an overall increase in global precipitation during the twentieth century independent of natural multidecadal climate rhythmicity.
- Monsoon precipitation did not become more variable or intense during late twentieth century warming; instead, precipitation responded mostly to variations in solar activity.
- South American and Asian monsoons were more active during the cold Little Ice Age and less active during the Medieval Warm Period. Neither global nor local changes in streamflow have been linked to CO₂ emissions.
- The relationship between drought and global warming is weak, since severe droughts occurred during both the Medieval Warm Period and the Little Ice Age.

Oceans

- Knowledge of local sea-level change is vital for coastal management; such change occurs at widely variable rates around the world, typically between about +5 and -5 mm/year.
- Global (eustatic) sea level, knowledge of which has only limited use for coastal management, rose at an average rate of between 1 and 2 mm/year over the past century.
- Satellite altimeter studies of sea-level change indicate rates of global rise since 1993 of over 3 mm/year, but complexities of processing and the infancy of the method precludes viewing this result as secure.
- Rates of global sea-level change vary in decadal and multidecadal ways and show neither recent acceleration nor any simple relationship with increasing CO₂ emissions.
- Pacific coral atolls are not being drowned by extra sea-level rise; rather, atoll shorelines are affected by direct weather and infrequent high tide events, ENSO sea level variations, and impacts of increasing human populations.
- Extra sea-level rise due to heat expansion (thermometric rise) is also unlikely given that the Argo buoy network shows no significant ocean warming over the past nine years.
- Though the range of natural variation has yet to be fully described, evidence is lacking for any recent changes in global ocean circulation that lie outside natural variation or were forced by human CO₂ emissions.

Chapter 7. Observations: Extreme Weather

- Air temperature variability decreases as mean air temperature rises, on all time scales.
- Therefore the claim that global warming will lead to more extremes of climate and weather, including of temperature itself, seems theoretically unsound; the claim is also unsupported by empirical evidence.
- Although specific regions have experienced significant changes in the intensity or number of extreme events over the twentieth century, for the globe as a whole no relationship exists between such events and global warming over the past 100 years.
- Observations from across the planet demonstrate droughts have not become more extreme or erratic in response to global warming. In most cases, the worst droughts in recorded meteorological history were much milder than droughts that occurred periodically during much colder times.
- There is little or no evidence that precipitation will become more variable and intense in a warming world; indeed, some observations show just the opposite.
- There has been no significant increase in either the frequency or intensity of stormy weather in the modern era.
- Despite the supposedly “unprecedented” warming of the twentieth century, there has been no increase in the intensity or frequency of tropical cyclones globally or in any of the specific ocean basins.