

Unmasking “An Inconvenient Truth”

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Summary for Policymakers

In *Inconvenient Truth* puts Al Gore at the vanguard of a growing worldwide movement that claims there is a planetary emergency from global warming. It is claimed that the looming Armageddon is of our own doing because of the burning of fossil fuels that are causing a build-up of carbon dioxide in the atmosphere. The more developed a country's economy then the more it is to blame, and the more it behaves that country to change its profligate ways. *An Inconvenient Truth* is a call to arms for government and community action to fight a perceived emergency.

The planetary emergency is presented as a logical extension of recent climate change. Dramatic photos of glacier retreat and other graphics conjure up an image that the earth is changing as it has never changed before. It is claimed that the impacts of climate change are already being felt in biosphere responses that are leading to species loss, disease explosion and landscape destruction.

Much of Al Gore's evidence for his claims lacks credibility when examined without the emotive baggage of impending disaster, blame and simplistic political solutions.

The Science

The presentation of the science of climate change by Gore is superficial, erroneous and misleading. In contrast to Al Gore's simplistic metaphors for the greenhouse effect, what climate science demonstrates are the following:

- CO₂ is almost exhausted as an agent for greenhouse global warming and increasing the concentration, including doubling from its present value, will have little impact on the earth's radiation budget.
- Water vapour is the primary greenhouse gas. Its role in the hydrological cycle is essential for balancing the excess solar radiation absorbed at the surface with the infrared radiation cooling of the atmosphere. The buoyancy of convective clouds causes overturning of the tropical atmosphere and distributes energy through the atmosphere. Convection is essential for linking and constraining the temperature of the atmosphere to the warmest ocean surface temperatures.
- The ocean and atmosphere circulations transfer excess heat from the tropics to the polar regions and so regulate surface temperatures over middle and high latitudes. More than 85 percent of the poleward transport of energy is by the atmosphere and middle and high latitude temperatures vary with the rate of transport.
- The oceans, with their much greater thermal and mass inertia, are the flywheels of the climate system. Relatively small changes in sea surface temperature pattern (for example associated with El Niño) can markedly change the atmospheric circulation and the rate of poleward transport of heat.
- Surface wind fields drive the ocean currents, including the slow meridional overturning circulations.
- The non-linear interactions between the oceans and the atmosphere are a source of internal variability of the climate system on timescales from years through millennia.

Recent Climate Change in Perspective

Al Gore focuses only on changes over the past few decades to century. He implies that the trends are unusual and will continue unabated. It is, however, a preposterous assertion that observed trends over the past few decades can be extrapolated into the future. These changes must be put in the context of the past million years.

- We have had major Ice Age conditions that have regularly recovered to Interglacial conditions with cycles of about 100,000 years. Typical impacts of the recovery are global temperature rise, ice sheet recession and CO₂ increase.
- The global temperature rise, ice sheet retreat and sea level rise during recent interglacials have had a recurring natural boundary, suggesting a natural strong constraint is imposed; CO₂ amplification of global temperatures (whether natural or anthropogenic) is an unfounded proposition.
- Fluctuations in glacier flow of the Greenland ice sheet are not unusual. Even during the Ice Age periods ice surges into the North Atlantic left glacial debris on the ocean floor at intervals covering a thousand years or more (Heinrich events).
- There is substantial evidence of global temperature fluctuations over the late Holocene on millennial timescales – eg, the Greek/Roman warm period, the Dark Ages, the Medieval Warm period, the Little Ice Age, and the modern warm period.
- The glacial retreat of the past two centuries is unremarkable and not irreversible, despite the claims of Al Gore to the contrary; surface ice sheets wax and wane on the millennial timescale.
- The claim of a 'stable climate' prior to industrialisation (the 'hockey stick' representation) cannot be sustained. The methodology of splicing low-resolution proxy data to high-resolution instrument data without a sound basis for comparing respective datum is flawed.

Interpretation of Weather Extremes

Al Gore is selective in choosing various recent severe weather events to make the case that they are unusual and due to global warming.

- Hurricane frequency and intensity are related to sea surface temperature (SST), but only in as much as hurricanes require a minimum SST to provide the necessary buoyancy of convection; evaporation from the surface (the energy source driving the systems) increases almost exponentially with SST increase.
- Atmospheric circulation characteristics must also be favourable. 1997, the year leading to the warmest year of the instrument record, was a season with record low numbers of systems in the Atlantic and Gulf of Mexico region – years of developing El Niño in the Pacific are linked to low numbers of hurricanes in the Atlantic-Gulf of Mexico.
- Internal factors inhibit intensification. As the intensity of a hurricane increases so there are natural forces that kick in to restrain development. Mass subsidence around the storm acts to warm the atmospheric environment and reduce convective buoyancy and mass overturning – both are necessary to release latent energy. Frictional drag on the surface wind increases as the cube of wind speed thus also constraining intensification.
- Storm damage statistics do not in themselves indicate an increase in hazard, only that the insurance exposure in hazardous locations has increased.
- Much is made of the damage by hurricane Katrina, a severe but not record intensity storm, but much of the loss of life and damage were due to a combination of inadequate action leading up to the storm, failure of vital infrastructure, and slow response following the storm's passage. There are lessons from Katrina, as there are after any major disaster, but cutting back on CO₂ emissions to prevent future hurricane damage is daft.

- There is no clear evidence of expanding deserts, except by poor land management practices. Shifting dunes is natural. The rainfall of semi-arid and arid regions often has decadal to centennial cycles. There is evidence that North Africa and the Middle East have been drying from a savanna-type climate that was more typical 5,000 years ago.

Polar Ice

Al Gore raises the spectre of massive ice sheet destruction from Greenland and Antarctica to raise sea levels by 10-15 m. There is every reason to believe that the Greenland and Antarctic ice sheets are stable despite some peripheral melting at low elevations during the brief summer.

- The Greenland ice sheet has been preserved despite previous Interglacials that were warmer than current temperatures. It has likely been in place for more than a million years. On the high plateau temperatures are less than minus 10C even in summer. Melting around the coastal margins and surging glaciers are not evidence of instability and there is no evidence of recent rapid sea level rise.
- Arctic sea ice has a natural rhythm of expansion and contraction between winter and summer and year-to-year variations are small in comparison to the annual cycle. It would require a strong surge of relatively warm water into the Arctic basin to prevent the formation of sea ice in the long winter darkness.
- The Antarctic Circumpolar Current driven by the westerly winds prevents the intrusion of warmer subtropical surface water to the Antarctic coastal margins. In addition, the wind stress causes upwelling of cold sub-surface water on the poleward margin of the current, further isolating the Antarctic continent. There is no compelling evidence that the Antarctic ice sheet is other than in mass balance.
- Touted warming and ice shelf destruction are mainly confined to the Antarctic Peninsula that extends equatorward towards South America, a small fraction of the total ice mass.

Geosphere and Biosphere responses

Al Gore makes much of a limited number of statistics on species change in response to recent warming. He then suggests this is happening across the biosphere and extrapolates to presumptions of species extinction.

- We would expect a change in species populations and distributions, reflecting differing adaptation and mobility characteristics, to any climate change.
- The general robustness of species is concluded from the survival from the dramatic changes that occurred as earth went through glacial to interglacial cycles over the past million years. This is especially true for those areas of North America and northern Europe over which the thick ice sheets advanced and retreated.
- Today's pristine coral reefs were but limestone cliffs during the last glacial maximum and have responded to higher sea levels and warmer tropical waters.
- Just as the boreal forests advanced poleward following the retreat of the ice sheets so too the biosphere flourished. Satellite evidence confirms the increase in plant growth over sub-Arctic regions during the past two decades of increased warmth.
- Species are not threatened by the recent global warming as conditions are not yet as extreme as the early Holocene. There is no evidence that polar bears and emperor penguins, to name two species quoted as being threatened with extinction, will not survive the current interglacial. After all, they survived previous climatic periods and there is no recent evidence that numbers are declining.
- Many species quoted as being threatened are also threatened by direct human activities. For example, algae blooms increase with land-based fertiliser run-off, sewage discharge and urban stormwater run-off. These blooms threaten coastal ecosystems but are best addressed through local management measures, not reduction in CO2 emissions.

'Collision of Earth and Humanity'

There are many examples offered by Al Gore under this theme but they are fear mongering at its worst and with no foundation in science.

- Despite Al Gore's protestations otherwise, Earth is demonstrated to be capable of providing food, clothing and housing to the present 6.6 billion population.
- There are regional hardships but these are strongly associated with recent natural disasters (eg, drought, flood or earthquake), tribal or religious warfare, or disease pandemics. These are not issues to be resolved by decarbonising the economies of developed countries.
- Cities and industrial regions of the developed countries have sensible measures in place to maintain clean air to a high standard. Regulations and market mechanisms are in place to discourage or punish real polluters. In this sense CO2 is not a pollutant and is vital to the biosphere.
- There is an acknowledged need to better manage resources, especially those becoming limited in availability. Better and more efficient utilisation of all resources, but especially energy, lowers costs and prolongs the lifetime of such resources.
- A green and sustainable future is a common objective of humankind. The disagreements surround strategies for achieving the object – either market-linked mechanisms or centrally directed government. It will not be achieved through an inefficient centrally planned and coercive regulatory environment that inhibits innovation and entrepreneurial initiative.

In Summary

- Al Gore has not substantiated a 'climate crisis' caused by human activities. The scientific basis of his claims is specious. Current climate variations are not outside the bounds of climate history. Projections of future climate are on the basis of rudimentary computer models that are unable to predict a season ahead.
- Weather and climate extremes are dangerous to humankind and improved knowledge of the climate system is required to better understand their occurrence and severity.
- Weather and climate hazards are mitigated through infrastructure planning, development of emergency response strategies, including aftermath assistance.
- Attempting to change the course of climate, especially by reducing carbon dioxide emissions will not effectively mitigate weather and climate extremes nor alter the future direction of climate.
- Access to energy and material resources is changing as new reserves are discovered and existing reserves depleted. This is reflected in market prices and substitutions.

It would be grossly inefficient of governments to interfere on the basis of the perceived superior knowledge of bureaucrats and unrepresentative NGOs, especially if the interference led to higher prices for essential commodities and a worldwide slowing of development. (emphasis by ILMCD editor)

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