

# Last Lecture



"We do not inherit the earth from our ancestors, we borrow it from our children."

Native American Proverb

Are Tsunamis caused by global warming?



### Tsunami

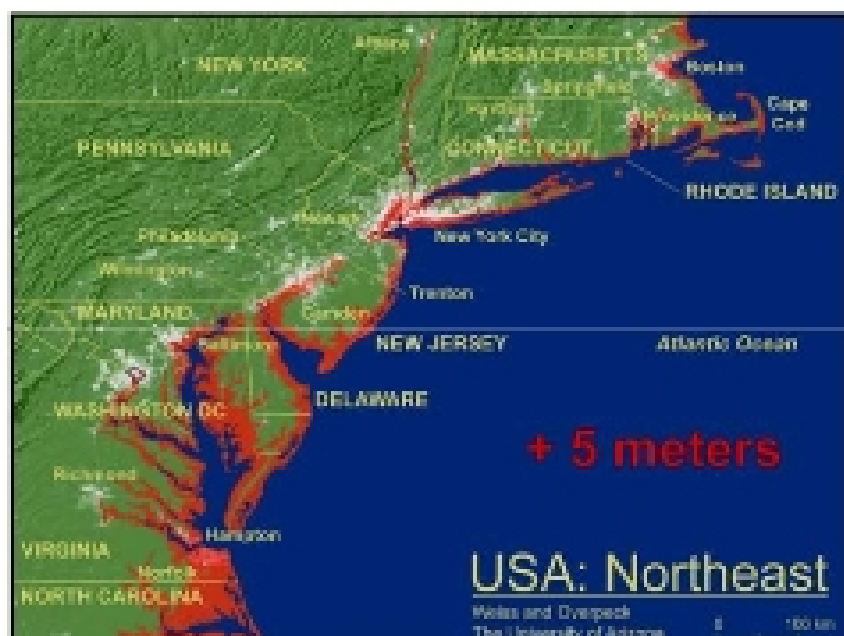
The world was stunned on December 26, 2004 when the powerful Sumatra-Andaman earthquake triggered tsunami that demolished many coastal areas of South and Southeast Asia.


No.

What would have to happen to get a 5 meter rise in global sea levels?

- A) Just mountain glacier melt
- B) Just sea ice melt
- C) About 10% of Greenland Ice Sheet
- D) Almost Entire Greenland Ice Sheet
- E) Almost Entire Antarctica Ice Sheet

	Area (10 <sup>6</sup> km <sup>2</sup> )	Volume (10 <sup>12</sup> km <sup>3</sup> )	Volume %	Sea Level m
Ice Sheets	14.8	25.8	100	~70
Greenland	1.7	2.6	9	~7
Sea Ice	21.0	0.05	0.2	0
Swamp	49.0	0.0025	0.008	0





### INTO THE COLD?

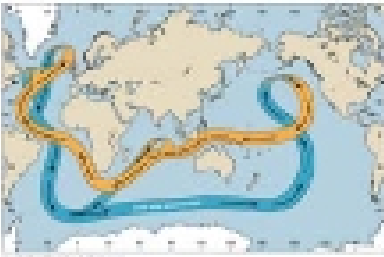
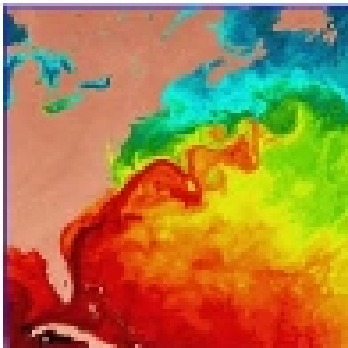
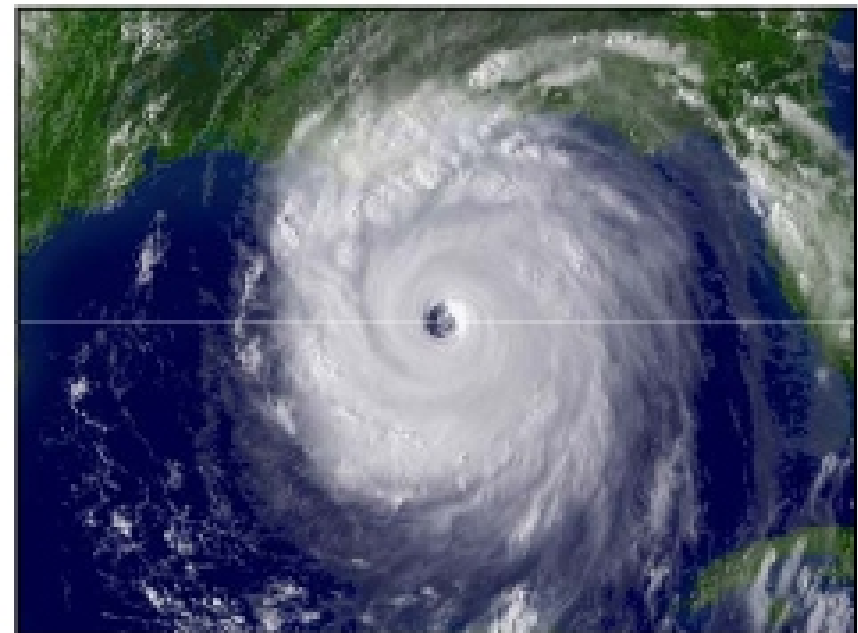
Stronger sea circulation could prevent climate - and health - from slipping

By Bruce G. Wilson | Special to The Christian Science Monitor

Call it global warming's little sibling. Two much publicized scenarios of the carbon dioxide (CO2) problem, probably familiar to most of us, revolve around the sea. One is the "melting of the ice" - a runaway process that could lead to a world of water - a sea of ice, and a way to a warmer planet.

There's another idea for the North Atlantic sea region: the climate system may be approaching the "iceberg" phase. If that really means a natural "iceberg" that'll rise the edge, the system will still deal with temperature jumps of both degrees and Europe, even with the planet as a whole continues to warm.

Recent scientific publications from models indicate this is not a likely scenario.

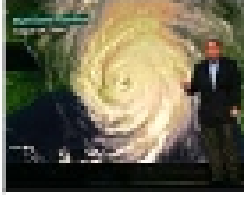
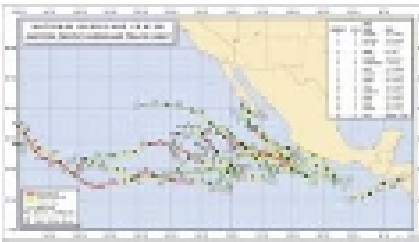
### Was hurricane Katrina caused by global warming?

### Are hurricanes statistically more likely to occur and more likely to be more powerful with warmer oceans?

### What is the difference between these two answers?

**Note that the next hurricane season was predicted to be bad, but was quite mild.**

**Does this disprove global warming?**



### Key Points

### What is solid scientific consensus?

### What is speculative?

### When does one point prove or disprove everything by itself?

**Notice that most of the points are important, but not to the overall picture...**

1. Judge Burton found that Gore's assertion of a rapid rise in sea-levels caused by the melting of icecaps in Antarctica was overly "alarmist."
2. Gore claimed that the disappearance of year-round snow from the summit of Mount Kilimanjaro in Africa was expressly attributable to global warming. The court was not convinced. According to Burton, the scientific "consensus" is that the reasons for the snow recession on Kilimanjaro cannot be established.
3. Gore cited a scientific study showing that polar bears had drowned by "swimming long distances--up to 80 miles--to find the ice." Evidence backing up this claim was not produced to the British court.
4. Gore attributed the Hurricane Katrina devastation to global warming. The judge found that there was "insufficient evidence to show that."
5. The Gore movie depicted the drying up of Lake Chad as a prime example of the effects of global warming. Expert testimony in front of the British court suggested that "far more likely causes" were "population increase, over-grazing, and regional climate variability."
6. Gore suggested an "exact fit" between the rise in carbon dioxide levels and the rise in temperatures over a period of 650,000 years. According to the judge, scientists generally agree that there is "a connection," between the two phenomena, but claims of an "exact fit" cannot be established.

7. An "Inconvenient Truth" claimed that citizens of some low-lying inhabited Pacific atolls "have all had to evacuate to New Zealand" because of the inundation of their islands caused by global warming. The judge said that he found no evidence of "any such evacuation having yet happened."

8. The movie suggested that global warming could shut down "the Ocean Conveyor," a process by which the Gulf Stream is carried over the North Atlantic to Western Europe. The judge cited a study by the Intergovernmental Panel on Climate Change (IPCC), the co-winner of the Nobel Peace prize, which concluded that it was "very unlikely" that the Ocean Conveyor would be shut down completely, although it might slow down.

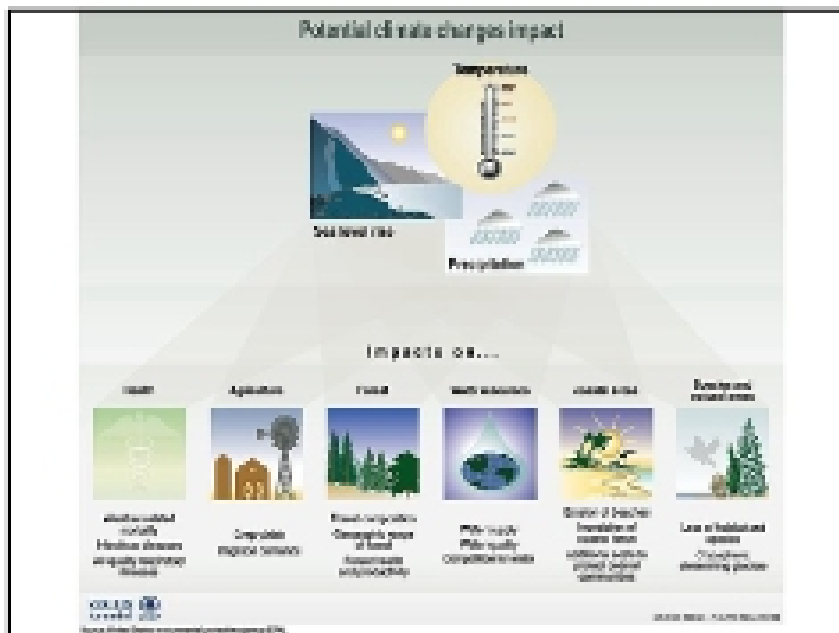
9. Gore argued that coral reefs all over the world were bleaching because of global warming and other factors. The judge cited the IPCC view that it was difficult to separate the impact of stresses on coral reefs caused by climate change from other stresses such as over-fishing and pollution."

\* Note that they did approve showing the movie in Great Britain public schools with the above caveats.

What do you think?

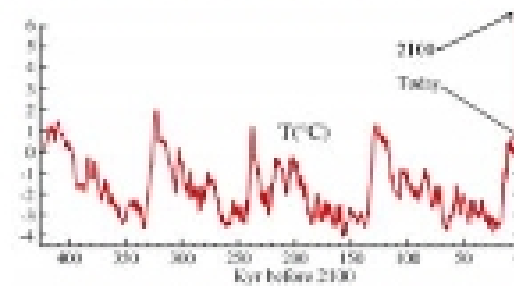
- A) It disproves global warming.
- B) It is irrelevant since the British judge is not a scientist
- C) It shows that some points are pushed too far
- D) It is appropriate to push points to get people's attention
- E) The movie and Al Gore do a great service

I personally and scientifically believe (C) and (E), though mostly (E).



What can we or should we do about it?

One item to realize is that our planet is never static. It is a constantly changing environment.

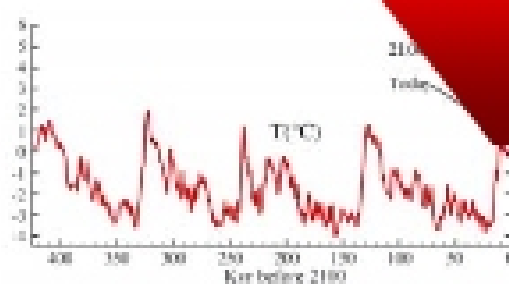
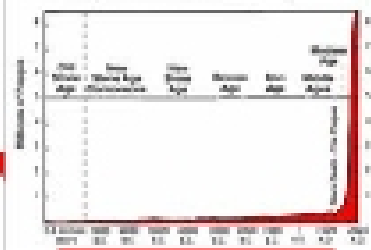


Ice ages are more often the norm.

There have also been far distant times when all the polar ice was melted.

The entire history of human civilization...

World Population Growth Through History



Changes in earth's orbit (perturbations from other planets), changes in the tilt axis, etc. all have impacts on global climate.



The earth will eventually enter another ice age.