

# Observations vs. Models (It's High Time to be a Climate Realist)

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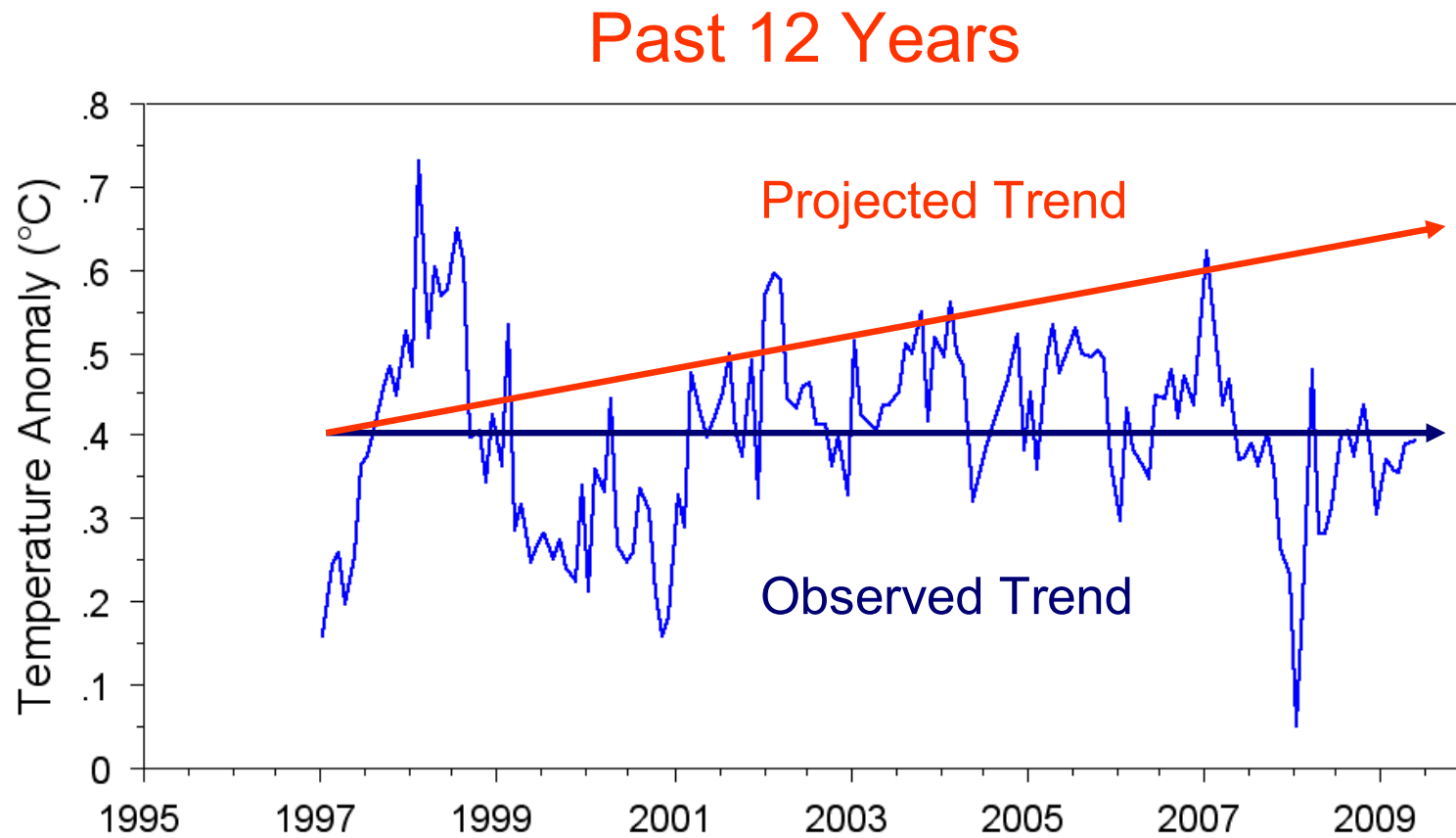
# *It is High Time to be a Climate Realist*

- No change in average global temperature for a dozen or so years
- Climate models fail to anticipate such an occurrence
- Sea level rise is just poking along (nothing catastrophic)
- Global hurricane activity is historically low
- Crop yields just keep on rising
- Our “health and welfare” has been increasing along with CO2 levels
- U.S. CO2 emissions rapidly declining in global import
- Legislation or regulations aimed at combating future climate change via U.S. emissions limitations will be completely ineffective and unverifiable.



# Global Warming?

- No change in average global temperature for a dozen or so years

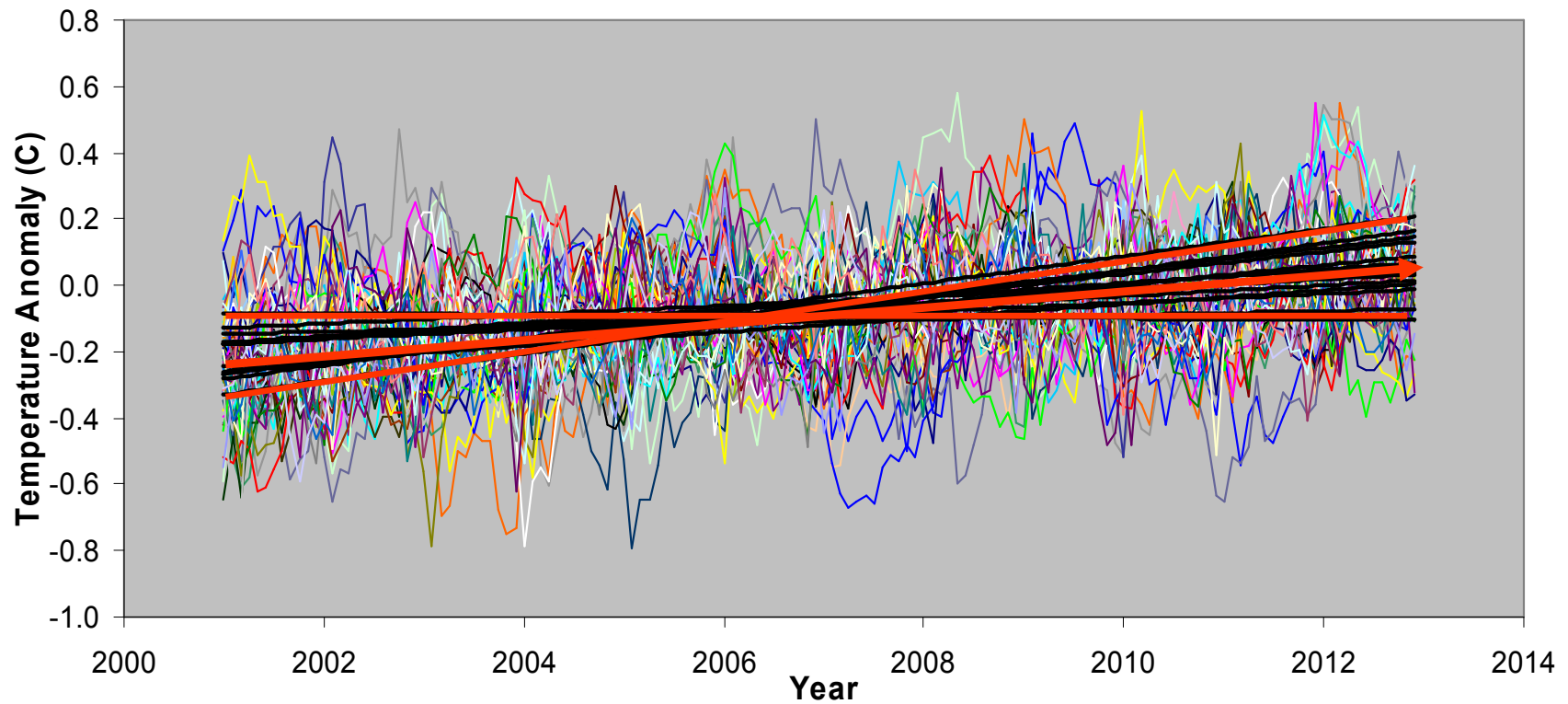


(Brohan et al., 2006)

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# Climate Models

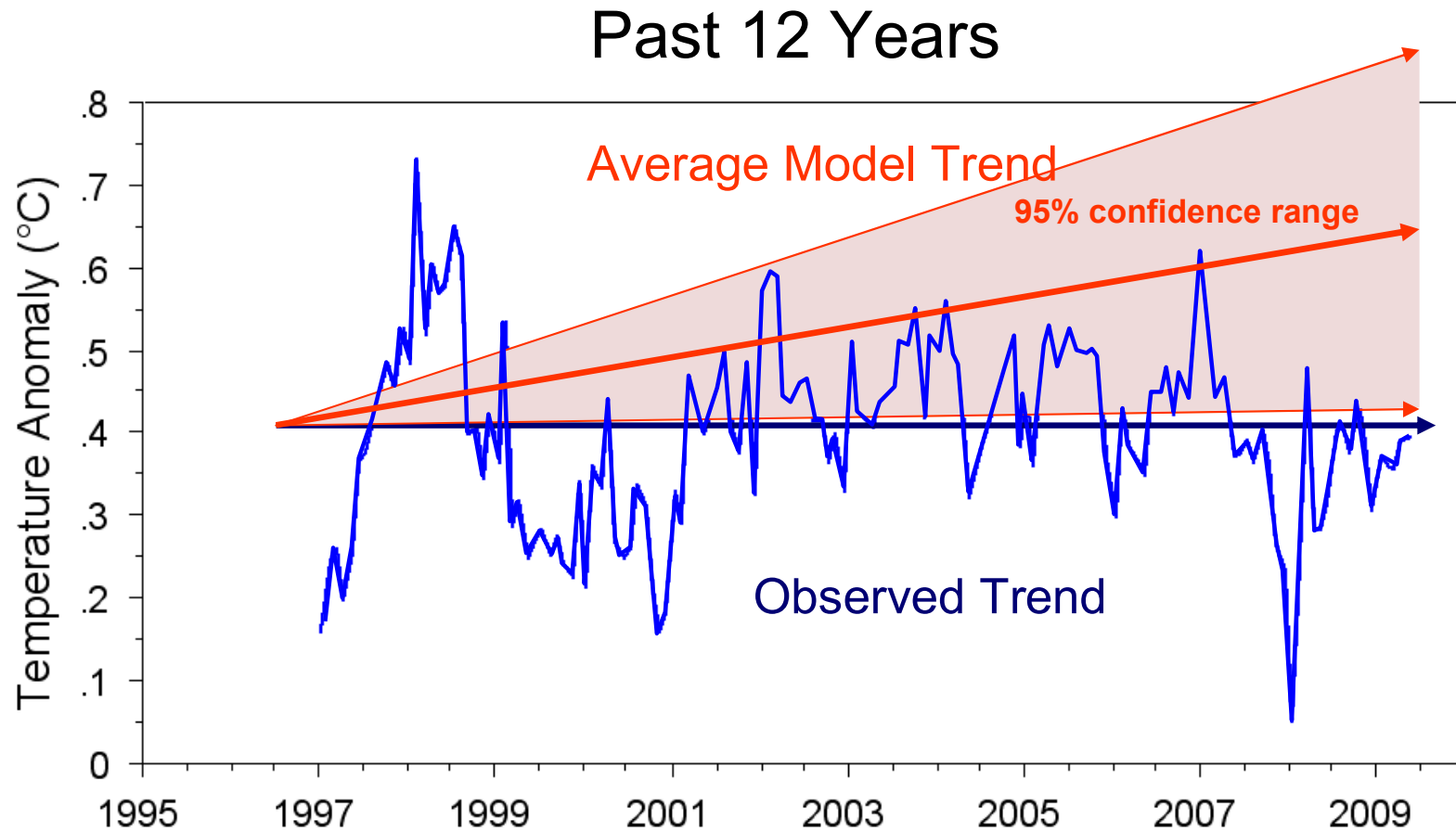
## Climate Model Projections



(IPCC, AR4, 2007)

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# Observations and Projections

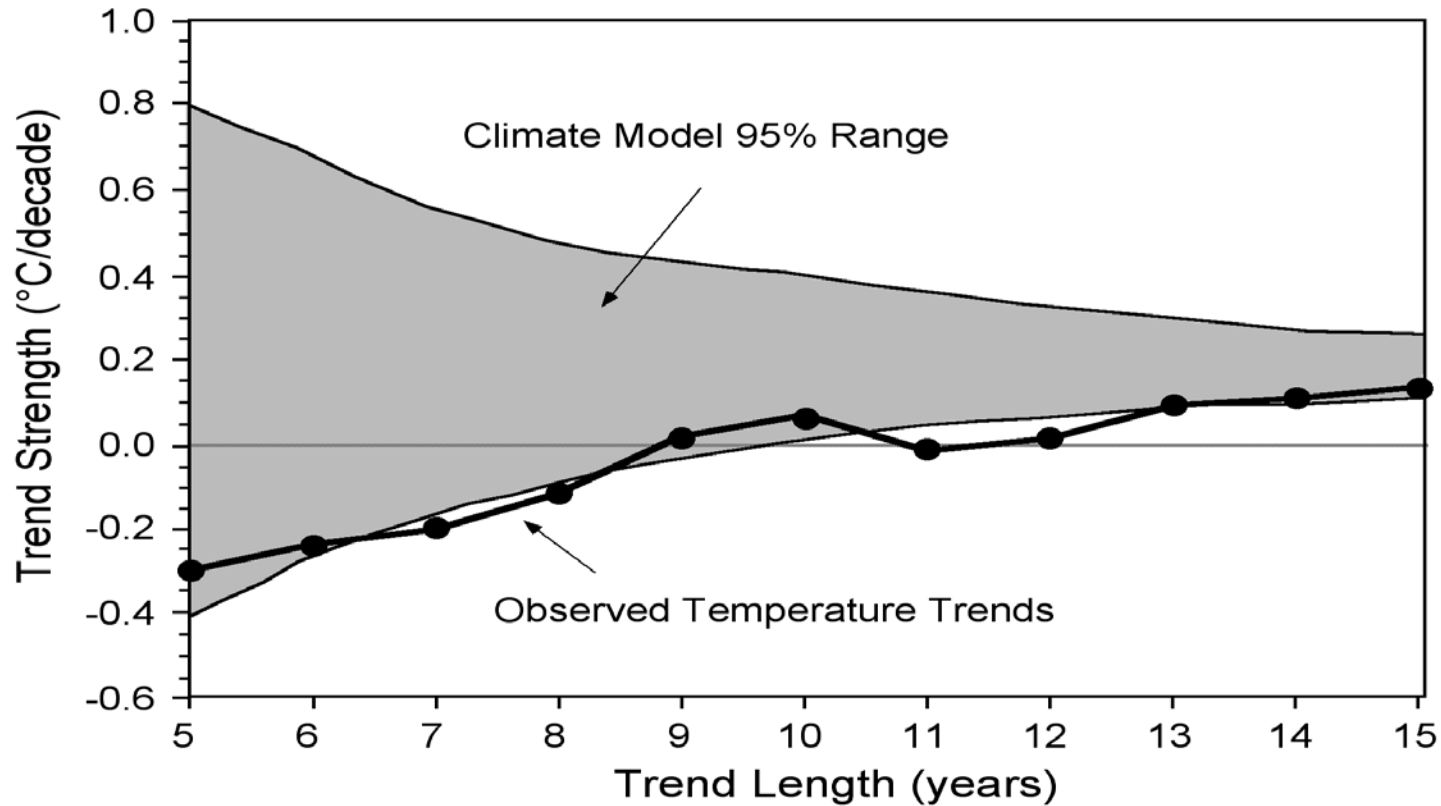


(Brohan et al., 2006)

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# Observations and Projections

- No change in average global temperature for a dozen or so years
- Climate models fail to anticipate such an occurrence



**Climate models are failing to capture Reality!**

(Michaels, 2009)

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# Sea Level Rise

- Sea level rise just poking along (nothing catastrophic)
- Projections of a 5 to 20 foot rise by the year 2100 lie far outside of the “scientific consensus”

## IPCC “consensus of scientists”

Case	Temperature Change (°C at 2090-2099 relative to 1980-1999) <sup>a</sup>		Sea Level Rise (m at 2090-2099 relative to 1980-1999)
	Best estimate	Likely range	Model-based range excluding future rapid dynamical changes in ice flow
Constant Year 2000 concentrations <sup>b</sup>	0.6	0.3 – 0.9	NA
B1 scenario	1.8	1.1 – 2.9	0.18 – 0.38
A1T scenario	2.4	1.4 – 3.8	0.20 – 0.45
B2 scenario	2.4	1.4 – 3.8	0.20 – 0.43
A1B scenario	2.8	1.7 – 4.4	0.21 – 0.48
A2 scenario	3.4	2.0 – 5.4	0.23 – 0.51
A1FI scenario	4.0	2.4 – 6.4	0.26 – 0.59

15 inches!

(IPCC, AR4, 2007)

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# Sea Level Rise

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Some claim that the IPCC is being “too conservative” and that it does not include processes that would cause a rapid speed-up of ice loss from Greenland resulting in dramatically higher rates of sea level rise

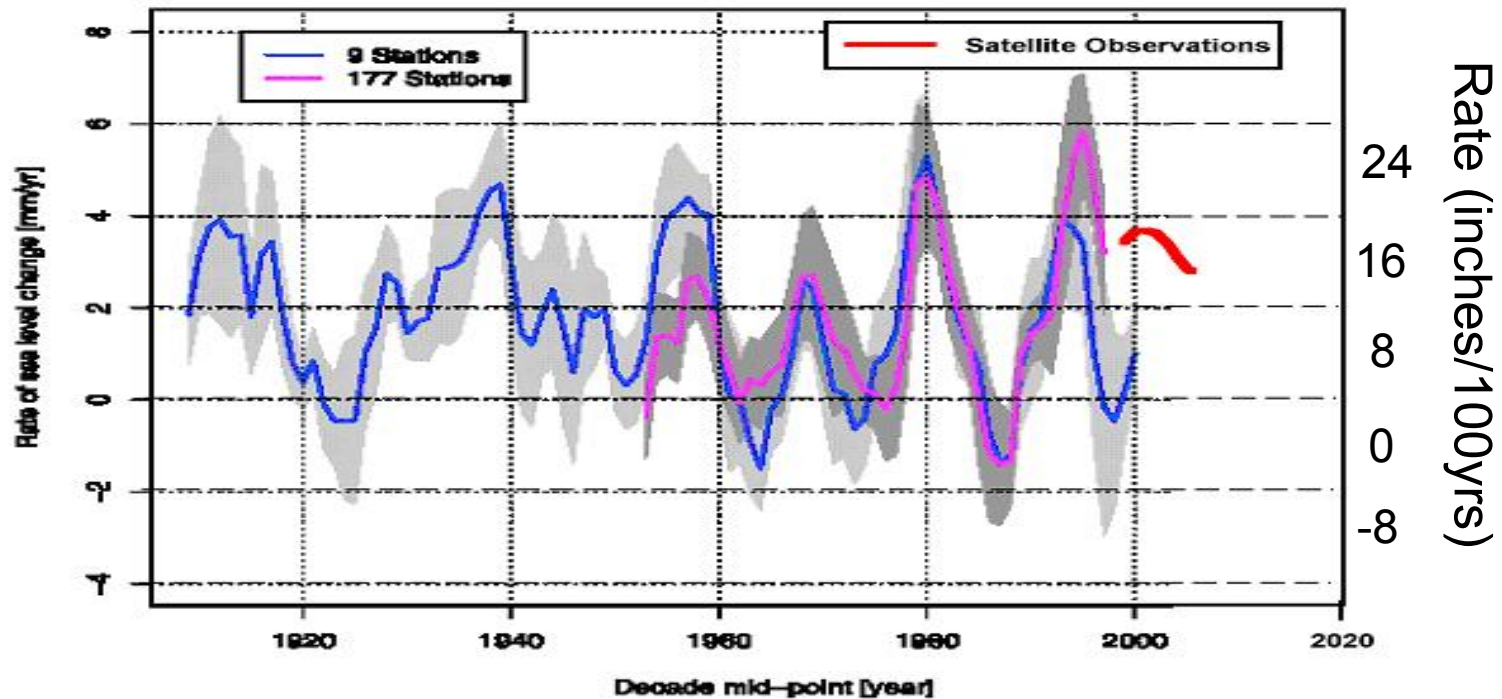
**Such claims are repudiated by the latest scientific evidence.**

- Nick et al., 2009: “[E]xtreme mass loss [of Greenland’s ice] cannot be maintained in the long-term, and that the recent rates of mass loss through increased outlet discharge should *not be extrapolated to the future.*”
- Kerr, 2009, reporting for *Science*: So much for Greenland ice’s Armageddon. “*It has come to an end,*” glaciologist Tavi Murray of Swansea University in the United Kingdom said during a session at the meeting. “There seems to have been a synchronous switch-off” of the speed-up, she said. Nearly everywhere around southeast Greenland, outlet glacier flows have returned to the levels of 2000. An increasingly warmer climate will no doubt eat away at the Greenland ice sheet for centuries, glaciologists say, but no one should be extrapolating the ice’s recent wild behavior into the future.

# Sea Level Rise

And just what is the ongoing rate of sea levels rise (from all causes)?

## Rate of Global Sea Level Rise



**~2-3 mm/yr, or ~8-12 inches per century!**

Slowing in recent years (or a return to average conditions)

(Holgate, 2007)

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# *Hurricanes*

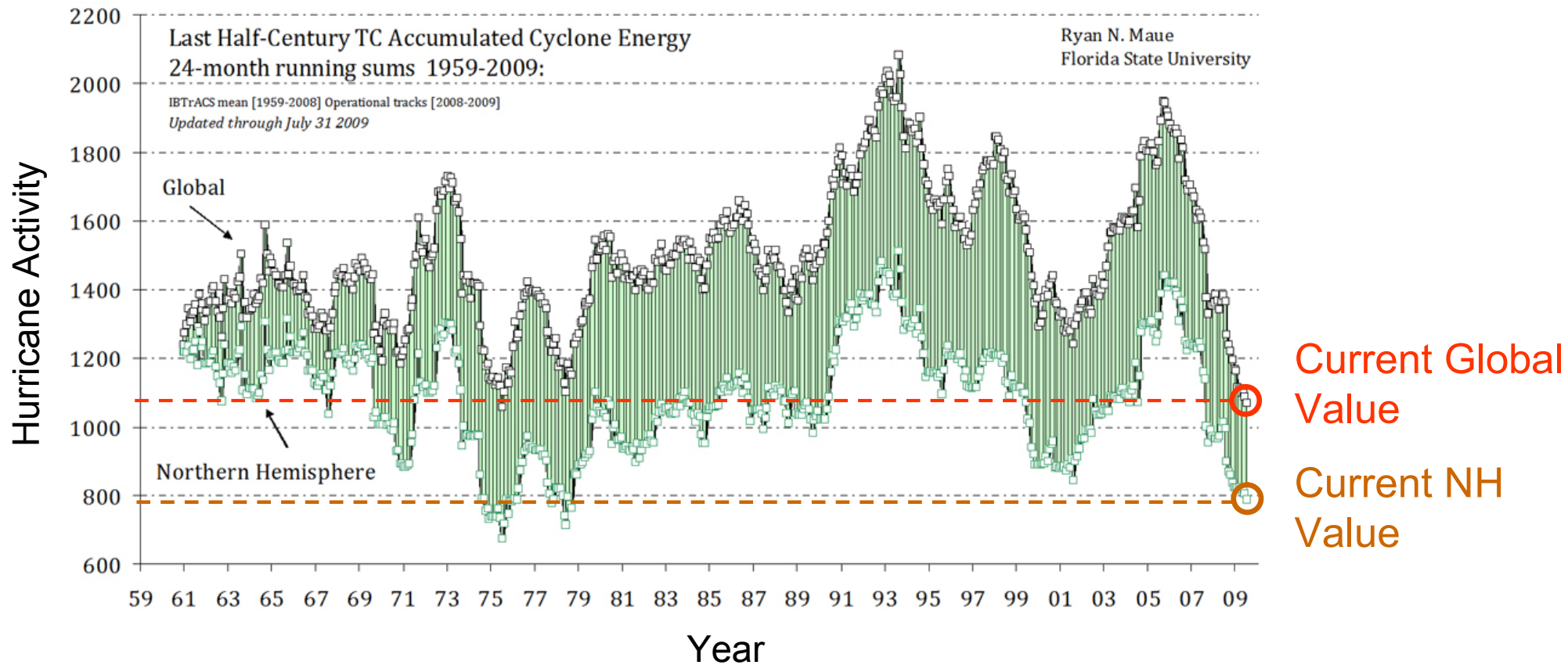
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- Global hurricane activity historically low
- No long-term trend in North Atlantic hurricanes
- No trend in damage statistics—once inflation, wealth, and populations changes are properly accounted for.

# Hurricanes

- Global hurricane activity historically low

## Global Hurricane Activity (2-year average)



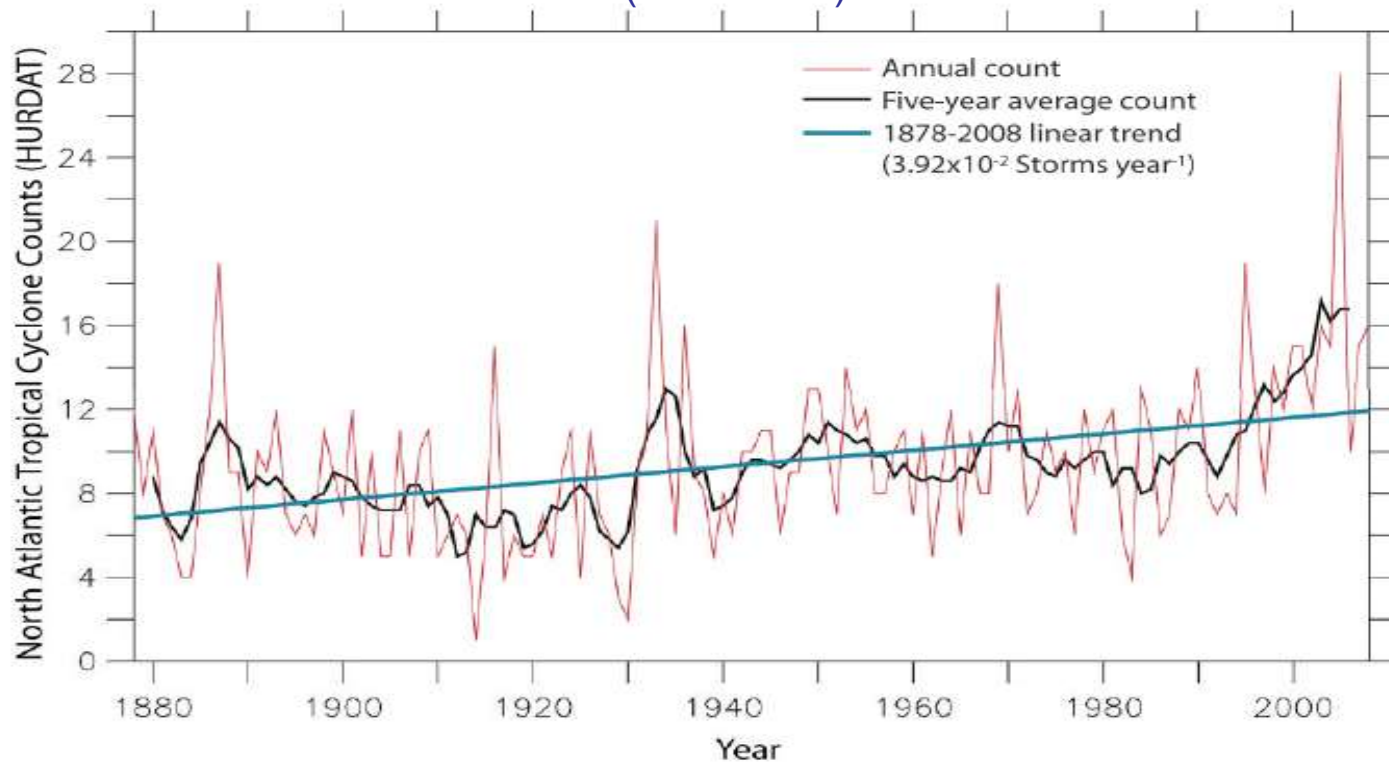
(Maue, 2009)

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# Hurricanes

- Changing observing practices give **inaccurate** indication as to the long-term trend in North Atlantic Hurricane Activity

## North Atlantic Tropical Cyclone Counts (1878-2008)



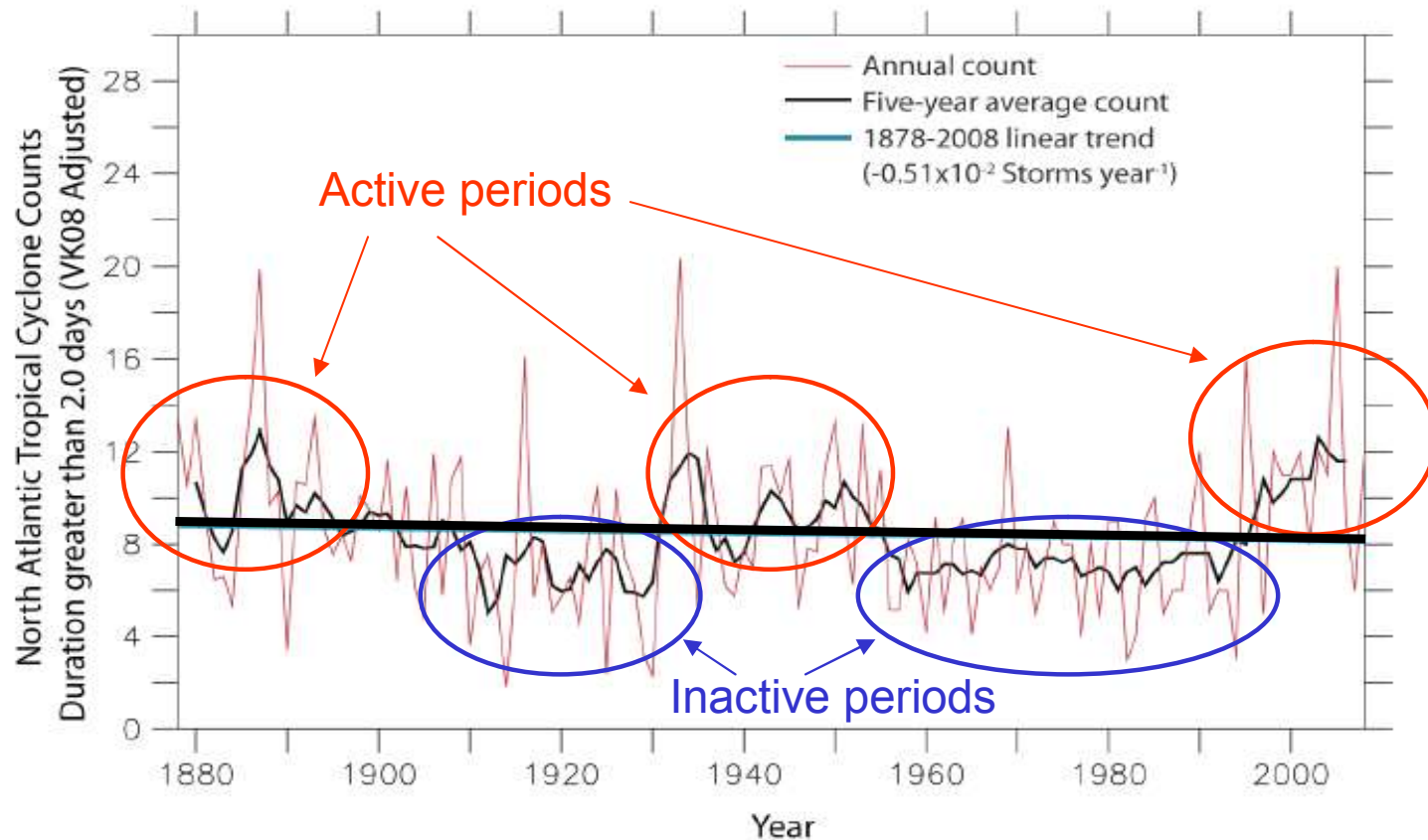
(Landsea et al., 2009)

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# Hurricanes

- No long-term trend in North Atlantic hurricanes

## North Atlantic Tropical Cyclone Counts



(Landsea et al., 2009)

But no long-term trend!

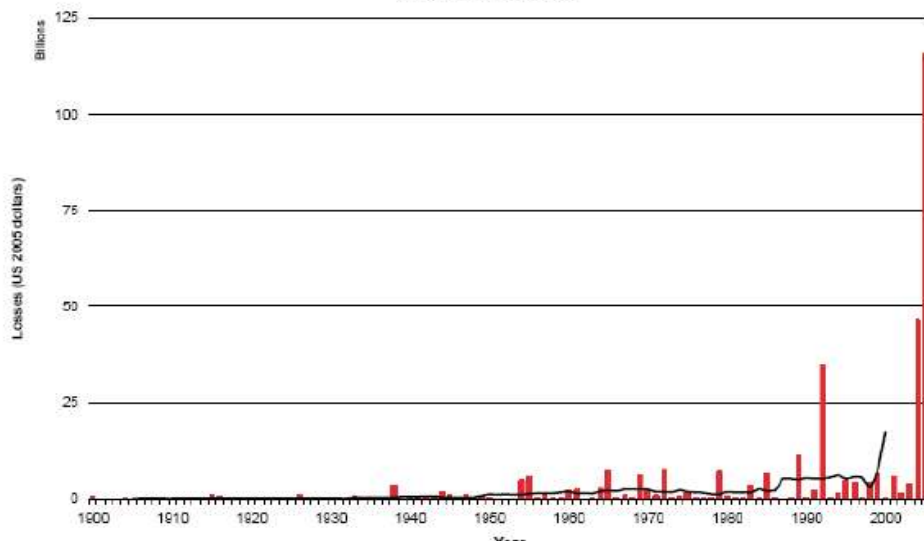
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# Hurricanes

- No trend in damage statistics—once inflation, wealth, and populations changes are properly accounted for.

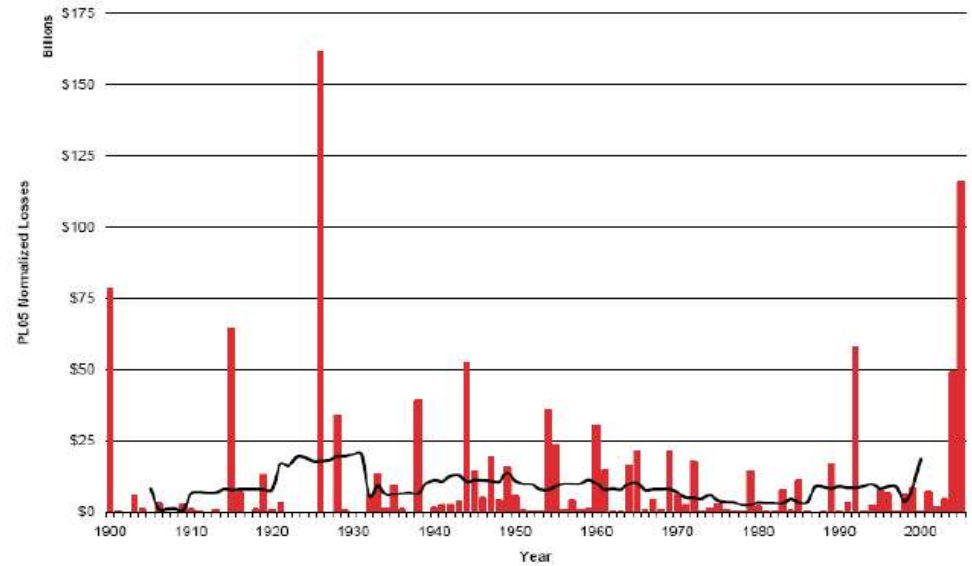
## Total U.S. Losses from Tropical Cyclones

Total Losses per Year from Atlantic Tropical Cyclones in 2005 Dollars  
(11-year centered average)



## Normalized Total U.S. Losses From Tropical Cyclones

PL05 Normalized Losses per Year from Atlantic Tropical Cyclones  
(11-year centered average)



(Pielke Jr. et al., 2008)

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# *Crop Yields*

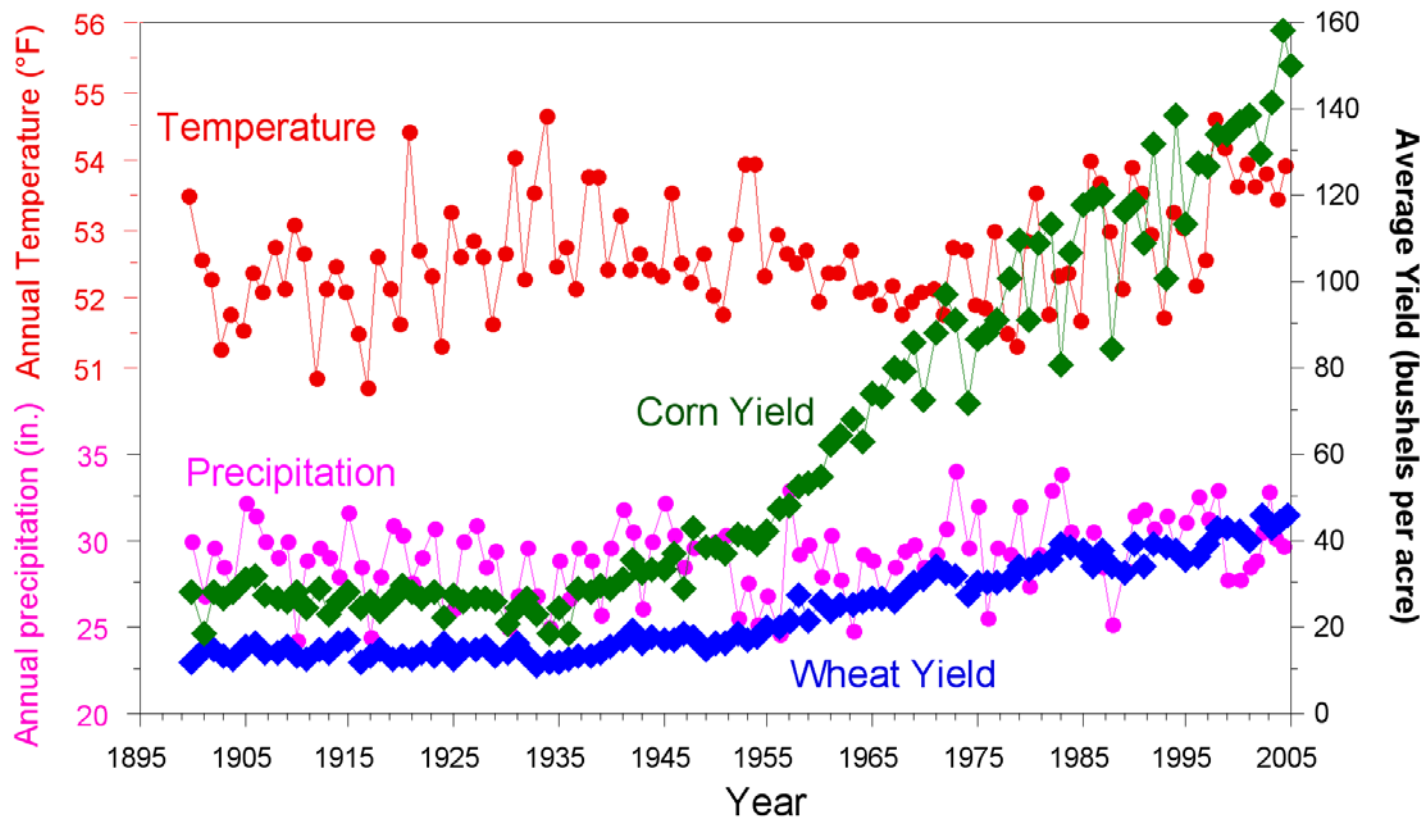
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- Crop yields just keep on rising (i.e., we are not “dumb farmers”)
- Global food crises arising from “global warming” are predicated on the notion that farmers will cling to old ways while the conditions change around them (a.k.a. “dumb farmer” scenario)
- Instead, farmers adapt to continually produce higher crop yields by embracing new technologies including tillage practices, irrigation techniques, improved crop varieties, or switching crops altogether.
- As a result, crop yields continually increase largely independently of climate fluctuations.
- As air-borne CO<sub>2</sub> is a plant fertilizer, generally the higher the atmospheric CO<sub>2</sub> content, the better and healthier plants (including food crops) grow.

# Crop Yields

- Crop yields just keep on rising (i.e., we are not “dumb farmers”)

## U.S. Historical Corn and Wheat Yields and Climate Fluctuations



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# *Health and Welfare*

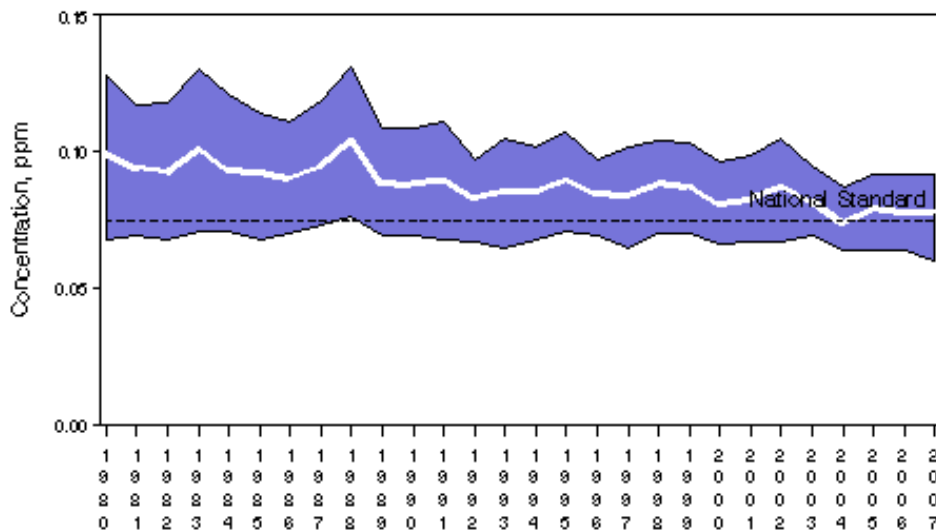
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- Our “health and welfare” has been increasing along with atmospheric CO2 levels.
- Crop yields are increasing because of better farming practices higher CO2 levels and longer growing seasons.
- Air quality has improved because of direct actions aimed at reducing pollutant emissions.
- We are less affected by heat waves thanks to the widespread use of air conditioning, medical improvements, and community awareness programs.
- And the most important measure of health and welfare--average lifespan--has been increasing.

# Low Level Ozone – U.S.

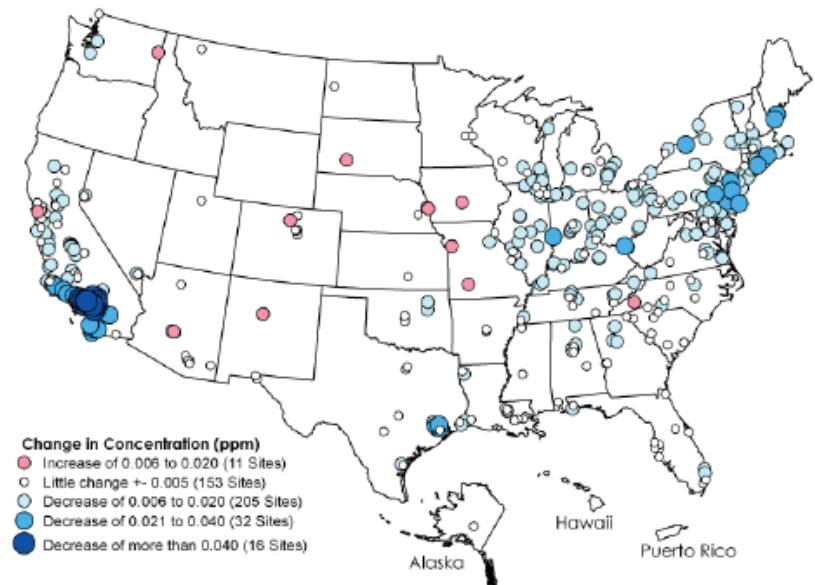
- Trends in low level ozone are on the decline across the U.S. since the 1980s – despite “global warming”
- Not taking these trends into account leads to inaccurate projections of future impacts

Ozone Air Quality, 1980 – 2007  
(Based on Annual 4th Maximum 8–Hour Average)  
National Trend based on 269 Sites



1980 to 2007 : 21% decrease in National Average

Change in ozone concentrations in  
ppm, 1990-1992 vs. 2004-2006

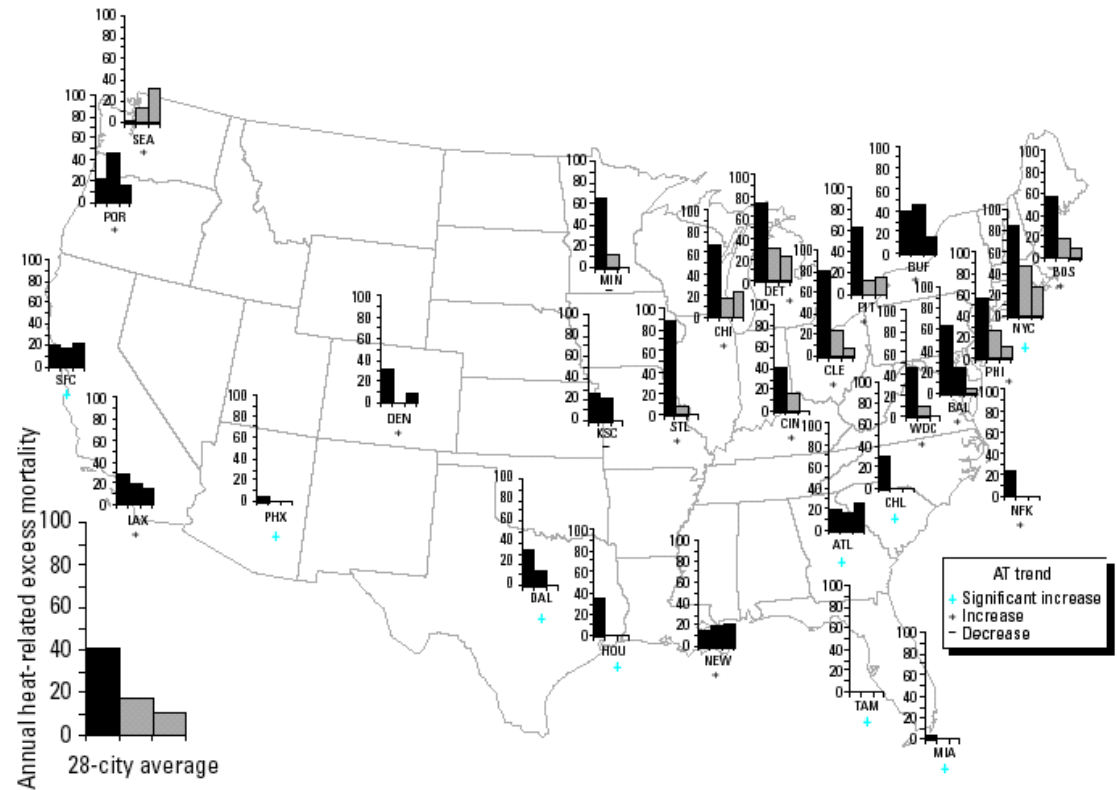


(EPA, 2009)

# Heat Waves – U.S.

- Populations in major cities across the U.S. are becoming less sensitive to extreme heat events
- Improvements in medical technology, access to air-conditioning, increased public awareness, and proactive responses
- Locations where extremely high temperatures are commonplace, have less heat-related mortality than places where extremely high temperatures are somewhat rarer
- If heat waves becomes more common in the future, we should expect that people will better prepared for them
- Not understanding these relationships lead to inaccurate assessments of the future impacts

(Davis et al., 2003)

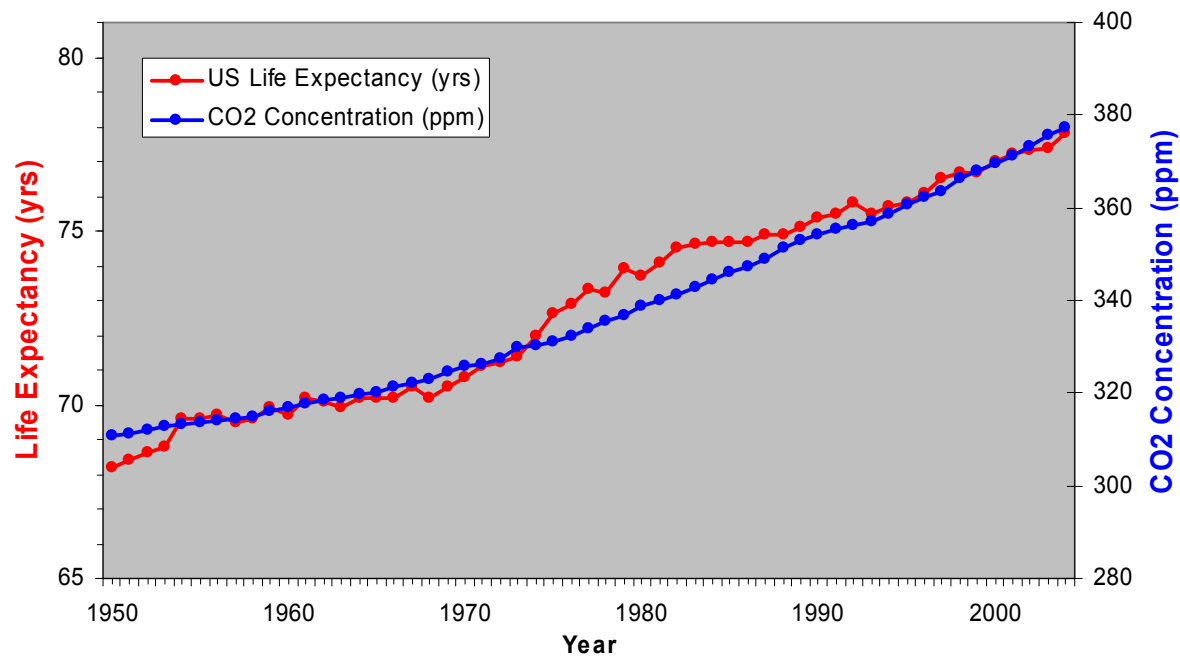


# Health and Welfare

- Our “health and welfare” has been increasing along with atmospheric CO2 levels

(While this may not be caused by increasing atmospheric CO2 levels, neither has it been prevented by them.)

U.S. Life Expectancy and CO2 Concentration



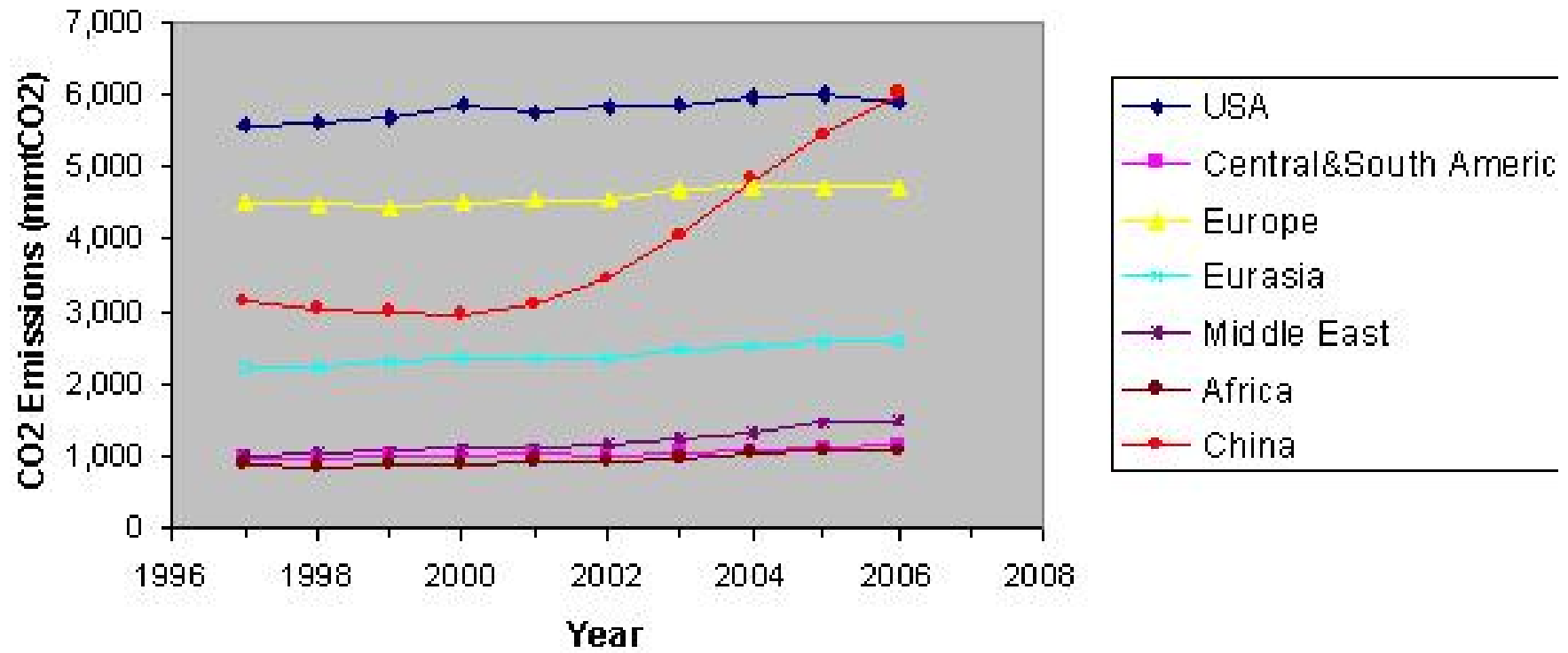
Far from “endangering” our health and welfare, our quality of life has flourished side-by-side with increasing CO2.

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# CO2 Emissions

- U.S. CO2 emissions are rapidly declining in global import
- China CO2 emissions are rapidly dominating global emissions.

Annual Energy-related Carbon Dioxide Emissions



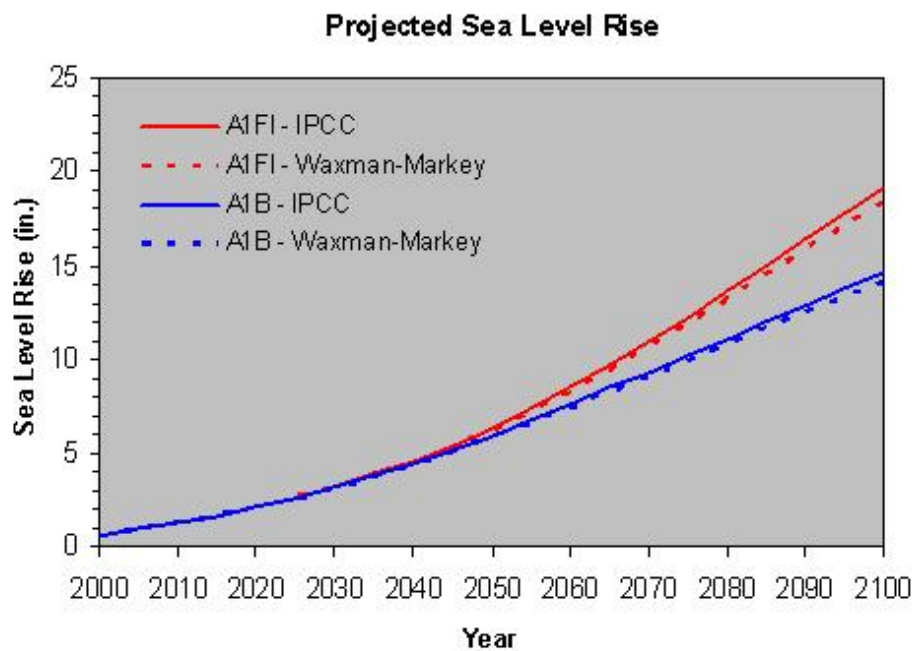
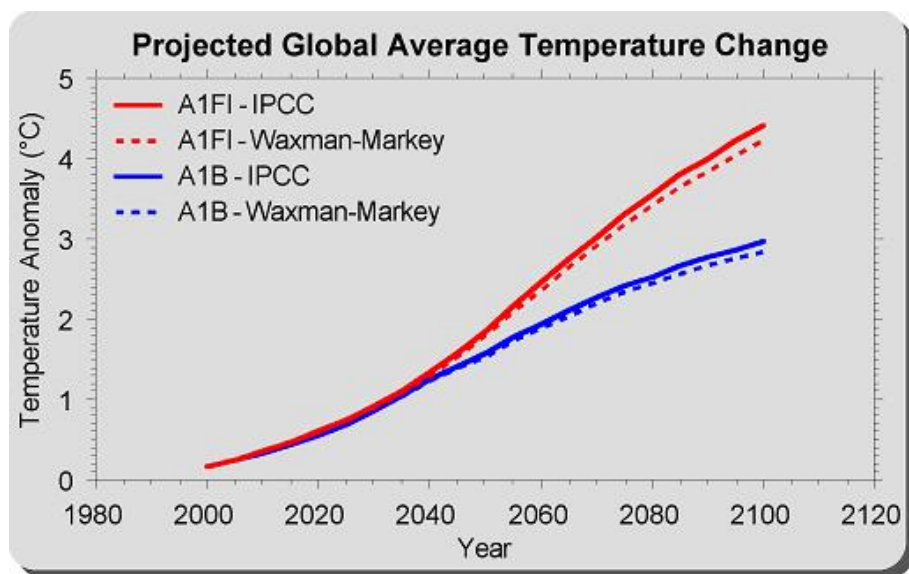
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# *Climate Impacts of Emissions Limitations*

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- Legislation or regulations aimed at combating future climate change via U.S. emissions limitations will be completely ineffective.
- Waxman-Markey Climate Bill
  - 3% greenhouse gas emissions reduction (below 2005 levels) by 2012
  - 20% reduction by 2020
  - 42% reduction by 2030
  - 83% reduction by 2050
- These are HUGE reductions!
- Feed these numbers into a climate model emulator, and here is what you get...

# Waxman-Markey Climate Bill



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# *Waxman-Markey Climate Bill*

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Year	Temperature Savings	Sea Level Rise Savings
2050	0.09°F	0.08 in
2100	0.20°F	0.42 in.

These values are so small as to be scientifically negligible and irrelevant.

# *Waxman-Markey Climate Bill*

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- Large natural climate variability, failing climate models, and an exceedingly small climate impact from reduced greenhouse gas emissions make it virtually impossible to gauge, much less verify, the effectiveness of any political attempt to “stabilize” climate.
- Thus, any suggestions that we will be able to discern the climate effectiveness of Waxman-Markey are invalid. Climate noise and model uncertainty overwhelm the expected signal under anyone’s math.
- For example, if the U.S. had trimmed CO<sub>2</sub> emissions in line with the Kyoto Protocol of 1997, would we now be touting our success in slowing global warming?

# Success?

It would be tempting...



...but it would be **WRONG!**

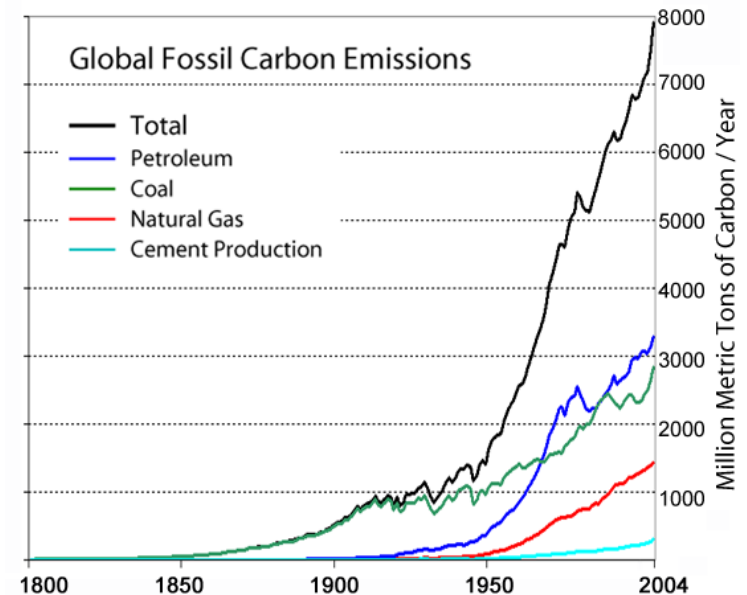
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# Summary

- Global CO2 emissions **rising** rapidly

But contrary to **alarmist** claims...

- **No change** in global temperature
- Rate of sea level rise is **slowing**
- Global hurricane activity is **declining**
- Crop yields are **increasing**
- Health and welfare are **improving**



While all of the above may not be a result of increasing CO2, increasing CO2 has certainly not stood in the way!

Efforts to try to reverse the course of things (why would you want to?) are both ineffective and unverifiable.

In light of all this, you have to wonder...

...**why would anyone be anything other than a climate realist?**