

# The Role of Science in a Changing World

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# Science Philosophy

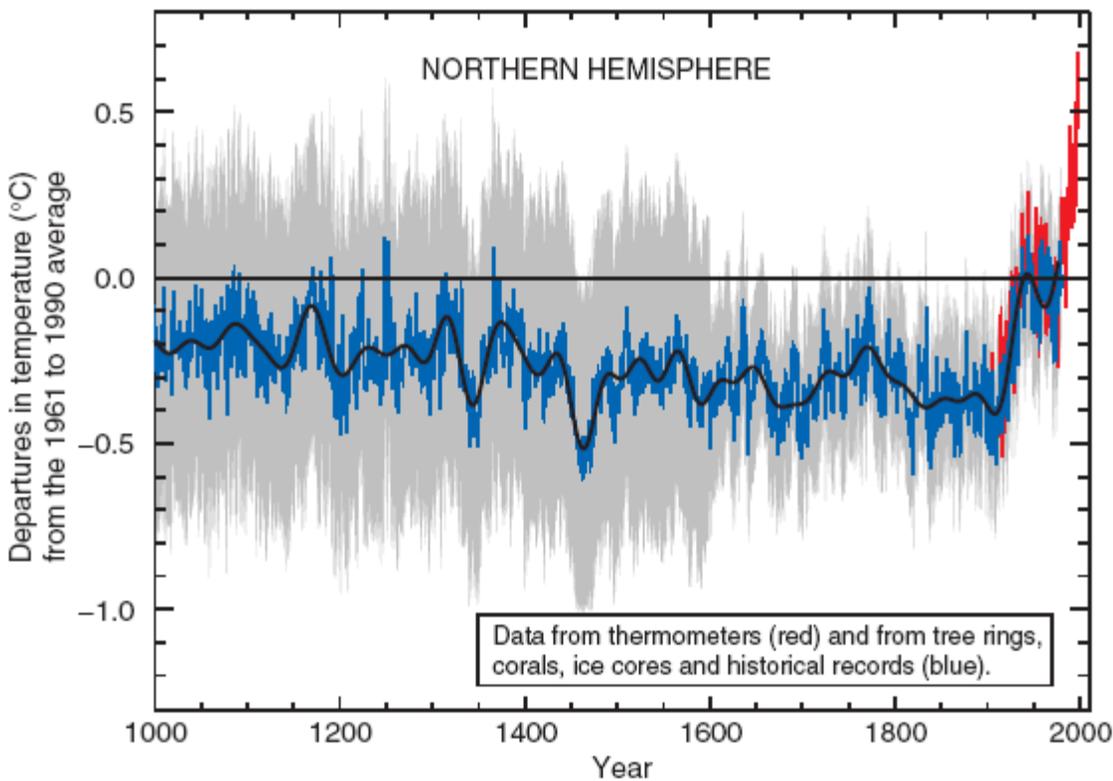
- From:
  - Source of objective information to inform decision makers
- To:
  - Subjective tool to advance narrow political, personal, or business interests
- i.e., A global philosophical change on the role of science in society

# Talk Outline

- Politicizing science: a global philosophical change
- Factors that lead to scientific abuse
  - Scientific reticence
  - Perceived need for widespread economic, social or political sacrifice
- Philosophical divide
  - Strictly objective versus citizen scientists
- Hope is on the way
  - Broad scientific engagement
    - UCS and [scienceinpolicy.org](http://scienceinpolicy.org)
  - A healthy reduction in oil consumption and carbon emissions

# Politicizing Science

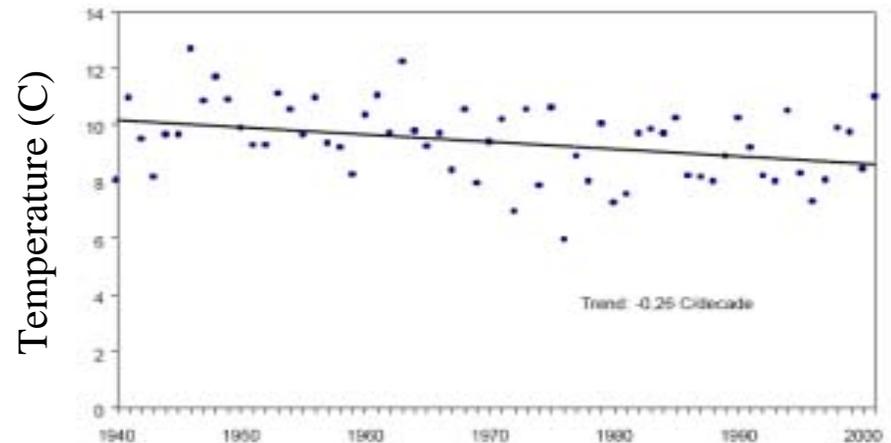
- All sides seem to distort science
  - Non-partisan
  - Environmental groups
  - Business
  - Blockbuster movies (e.g., *The Day After Tomorrow*)
- Not new but unprecedented
  - Highest levels of government
  - Ubiquitous (environmental, health, defense, etc.)



IPCC, (2001)

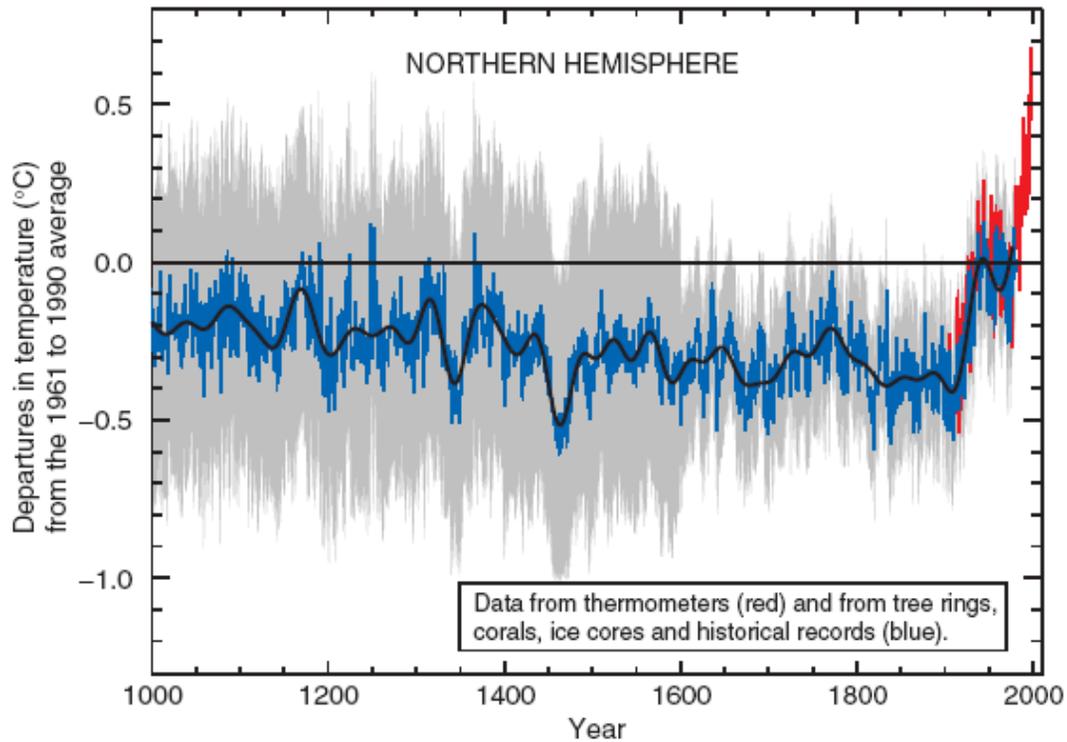
- Unprecedented increase
- Widely accepted

October-November Mean Temp  
1940-2001 Erie, Pa

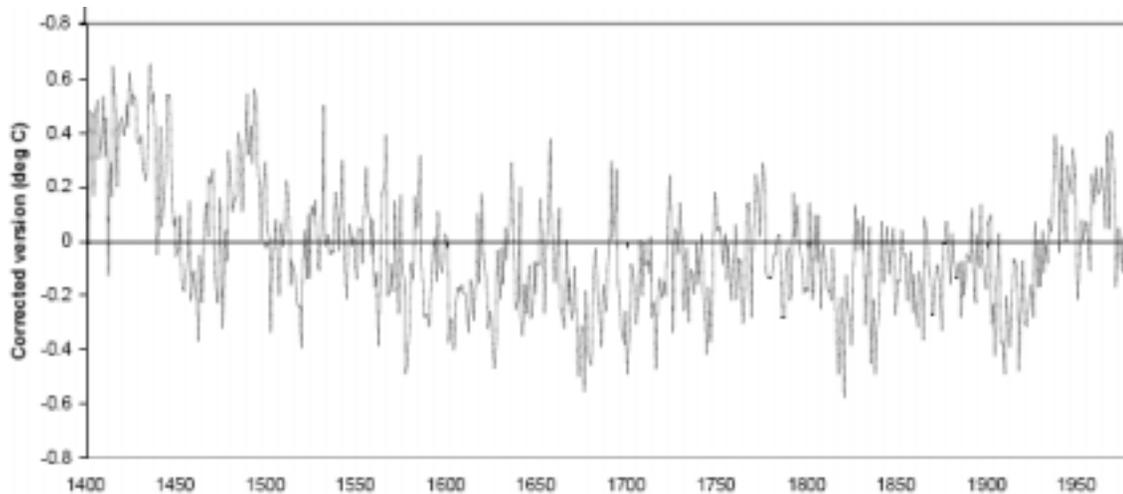


McKittrick, (2002)

- Selected locations counter to general trend
- Complexity makes it easy to present a biased view



IPCC, (2001)



McIntyre & McKittrick

- Reanalysis widely refuted
- Truncated in 1980
- Changes to an EPA draft report

# Bush's Plan: Cut Intensity 18%

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  - 1990-2000
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- Actual impact
  - 4% emission reduction in 2012
  - Emissions increase 13-15%

# Factors Contributing to Abuse

- Scientific philosophical divide
  - “strictly objective” vs. “citizen scientist”
- Perception that widespread economic, social or personal sacrifice will be necessary

# Philosophical Divide

(a straw man)

- Strictly objective
  - Unbiased
  - No external influence
  - Apolitical
  - Maintain credibility
- Citizen scientist
  - Members of society
  - Unique understanding
  - Funded by tax payers

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The Bridge:

Commitment to scientific objectivity implies a need for public engagement to restore scientific integrity (i.e., the citizen scientist)

# Restoring Scientific Integrity

- 5000 scientists endorsed a UCS statement calling for an end to the Bush administration's abuse of science
  - 48 Nobel laureates
  - 62 National Medal of Science recipients
  - 129 NAS members
- Over 1700 endorsed a similar statement authored by [www.scienceinpolicy.org](http://www.scienceinpolicy.org)

# Factors Contributing to Abuse

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# Car Based Transportation

- Benefits

- Convenient
- Fast
- Independent

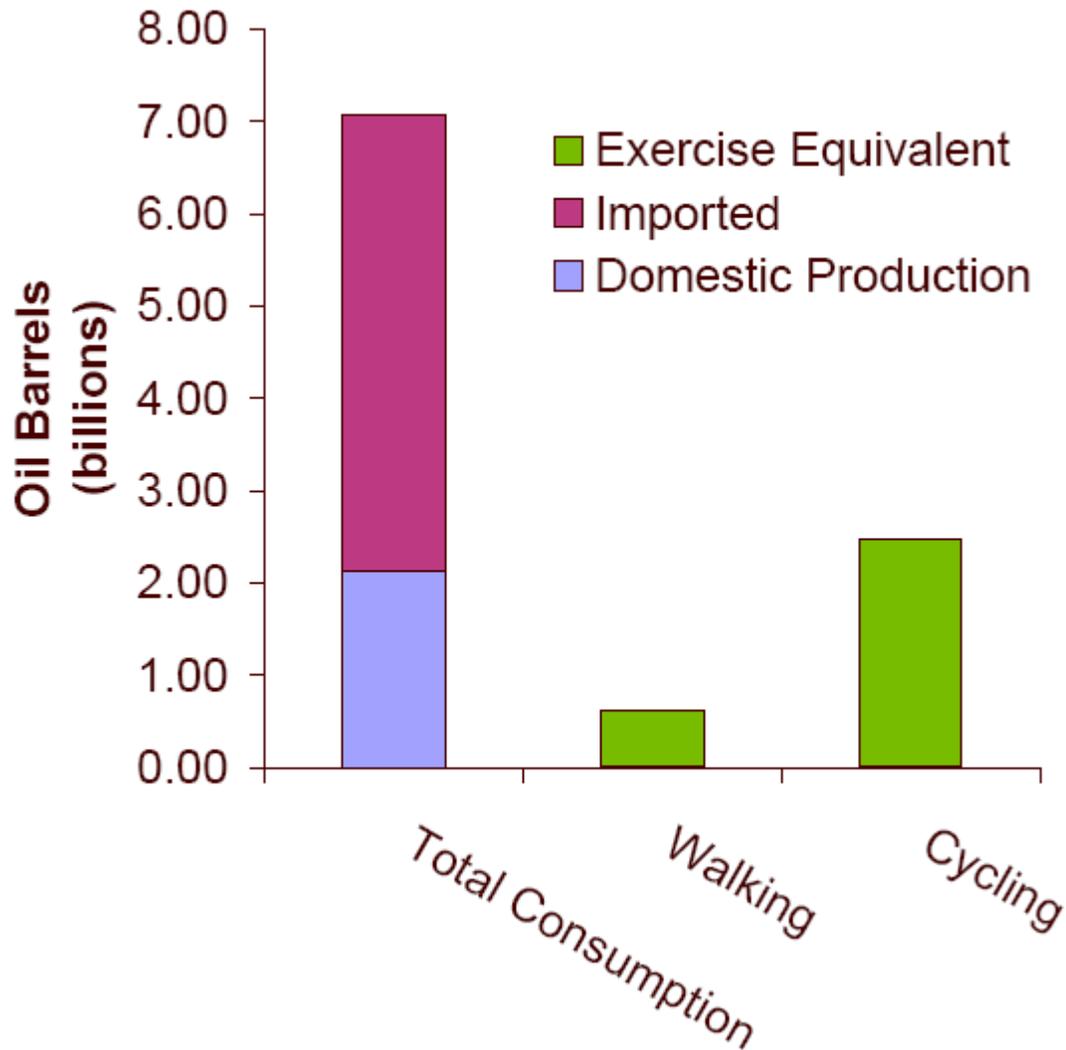
- Costs

- Oil dependence
  - National insecurity
  - Economic insecurity
- Carbon emissions
- Pollution
- Habitat degradation
- Physical inactivity
  - Poor health

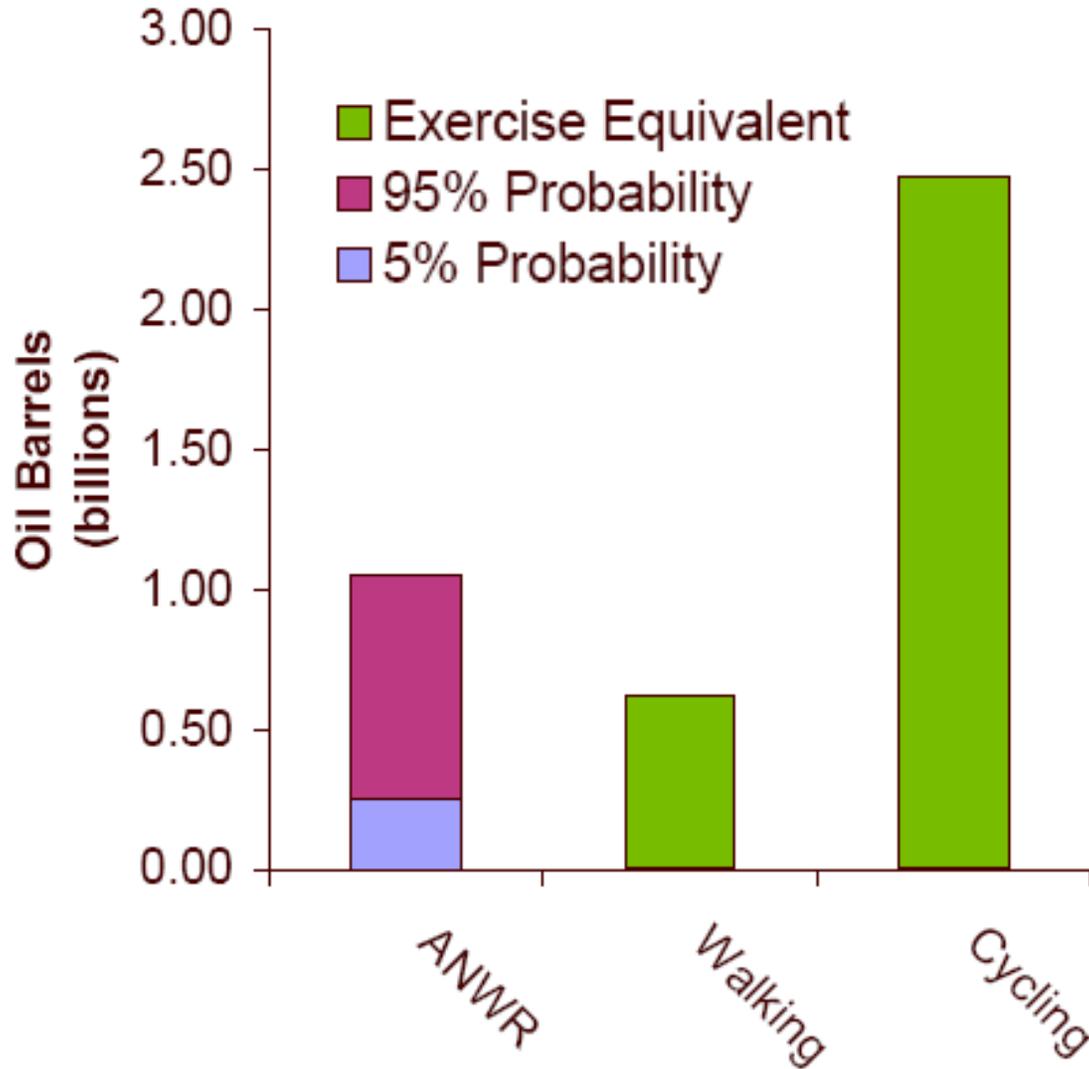
# Approach

- Calculations that substitute recommended daily exercise (e.g., walking or biking) for driving
  - Oil demand
  - Carbon emissions
  - Weight loss

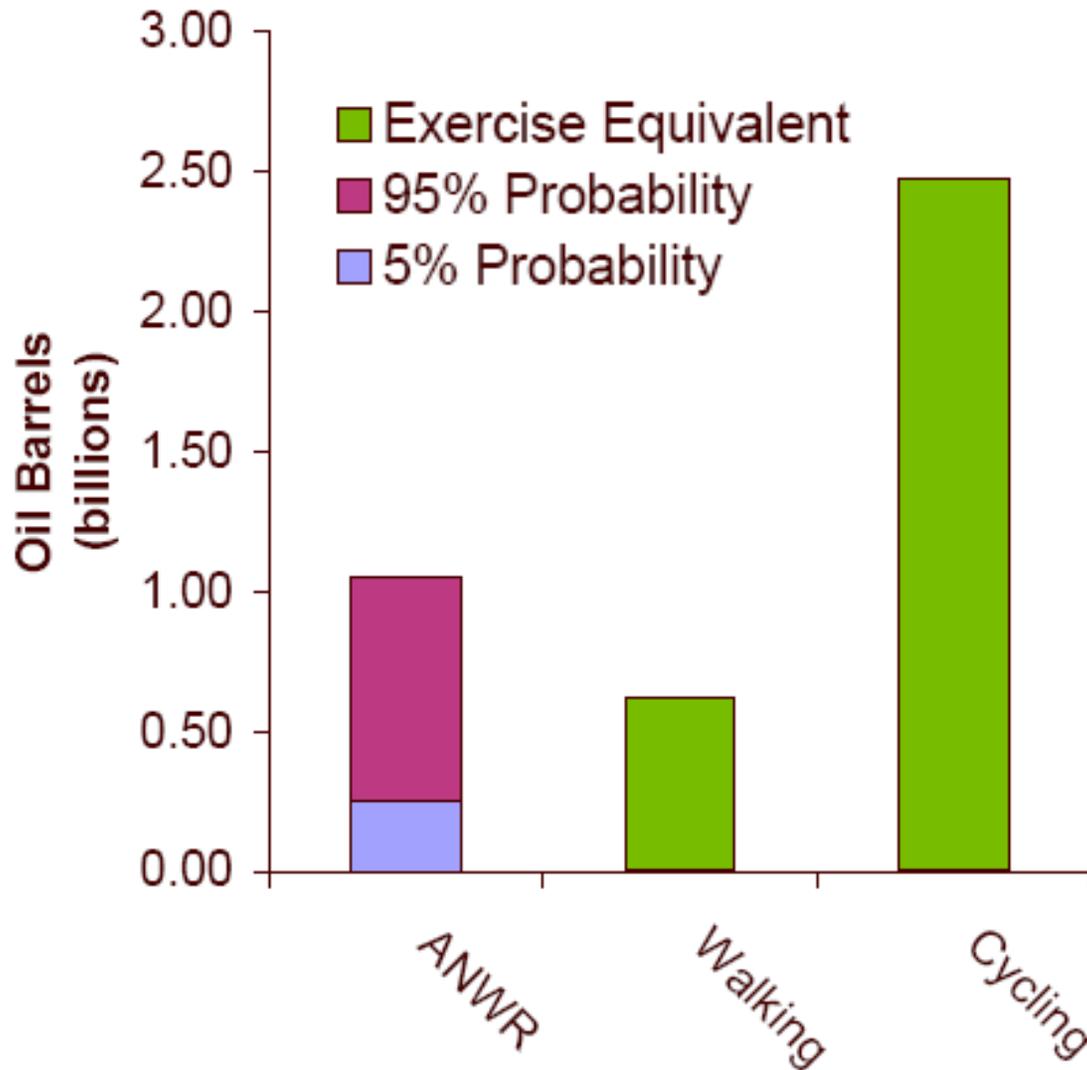
# Substitution of Exercise for Driving Would Reduce Oil Demand



# Substitution of Exercise for Driving Could Produce More Oil than ANWR and Help Control Weight



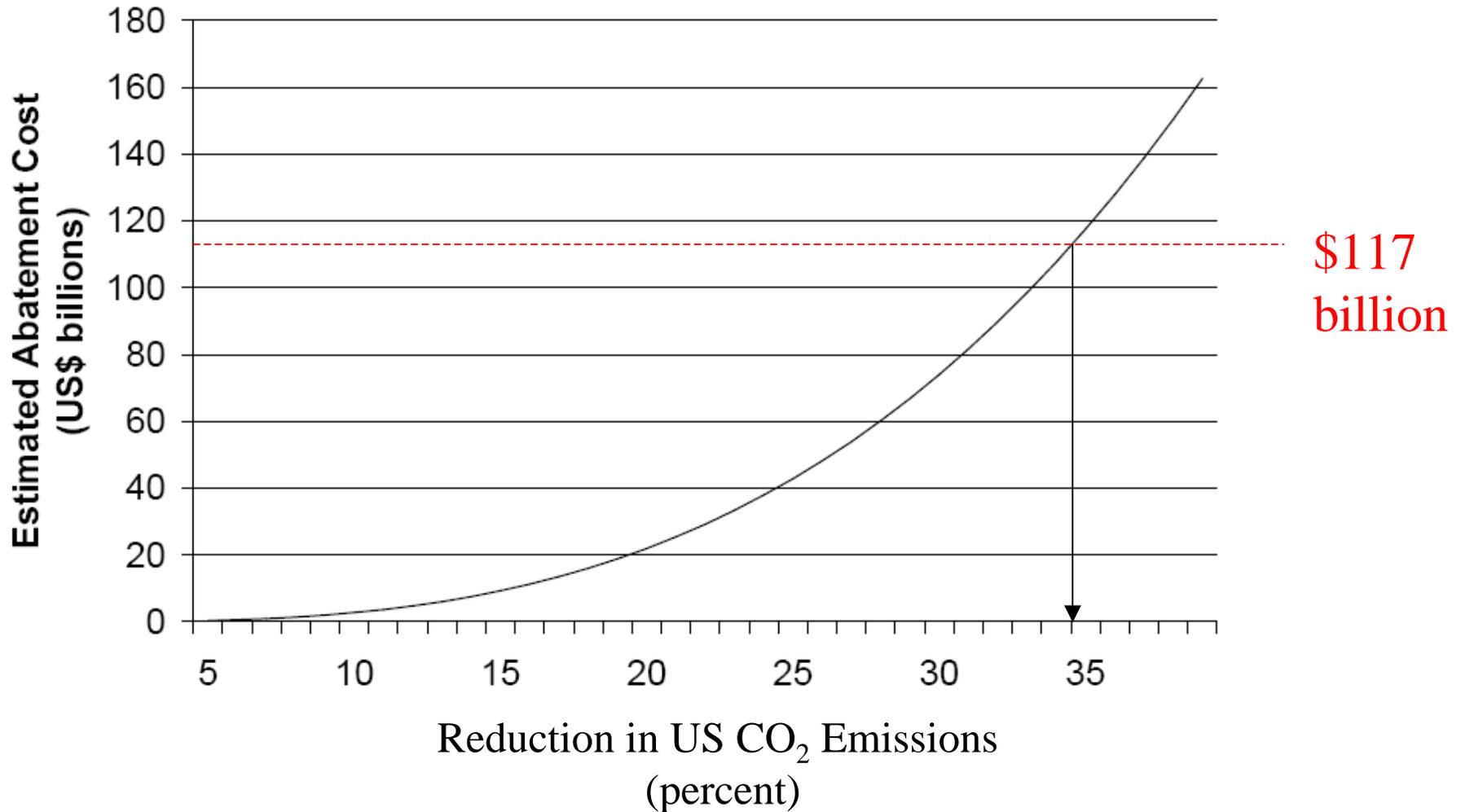
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weight control

- 12.2 kg/yr walking
- 26.0 kg/yr cycling

# Health Care Saving Sufficient to Eliminate Roughly 35% of US CO<sub>2</sub> Emissions



# Exercise Based Transportation

- Could reduce oil demand, control carbon emissions, and improve health
  - Equal to more oil than contained in the Arctic National Wildlife Refuge
  - Exceed the Kyoto Protocol at no net cost

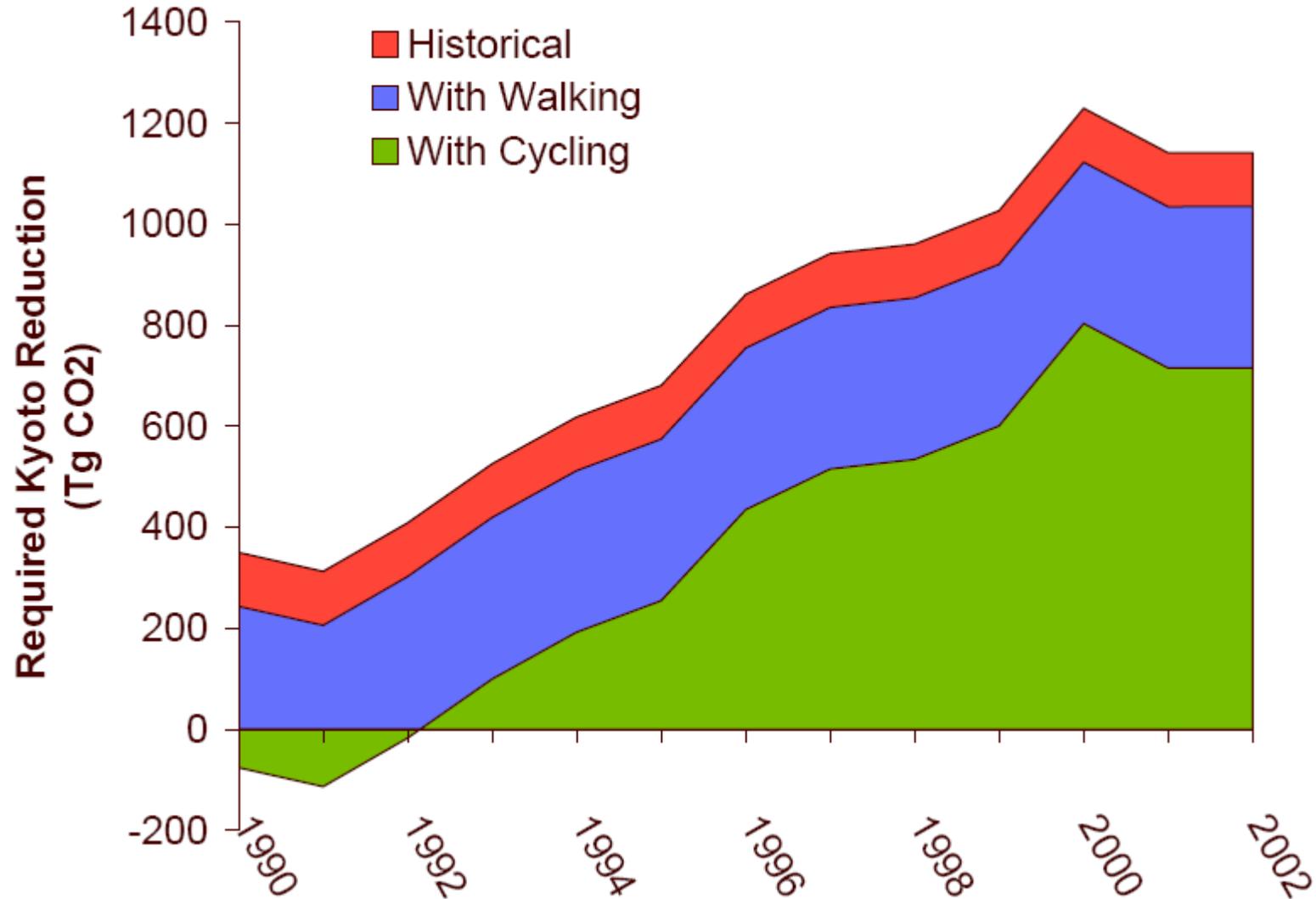
# Conclusions

- Global change includes more than the changes to the physical environment
  - Abuse of science at highest levels of government with global implications
    - Undermine society's ability to address physical global changes
    - Role of science in society
- Scientific response suggests this global change is reversible
- The most pressing societal problems need not require economic, social or personal sacrifice

# Acknowledgements

- GCEP (DoE), NSF
- Jeff, Milt, Mary, Steve Schwartz
- Stephen Porder, Kai Chan, Millicent Higgins, Liz Hadly, John Harte

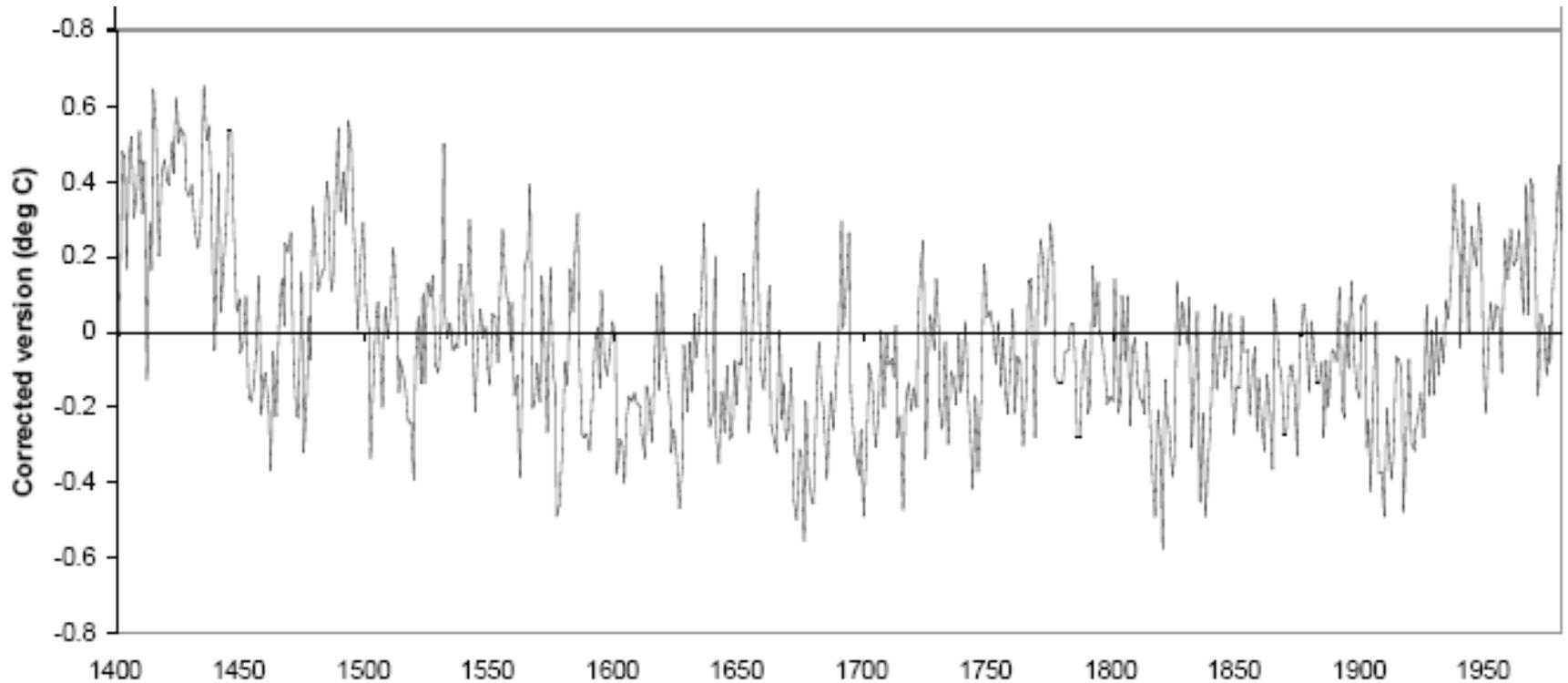
# Potential CO<sub>2</sub> Emissions Forgone



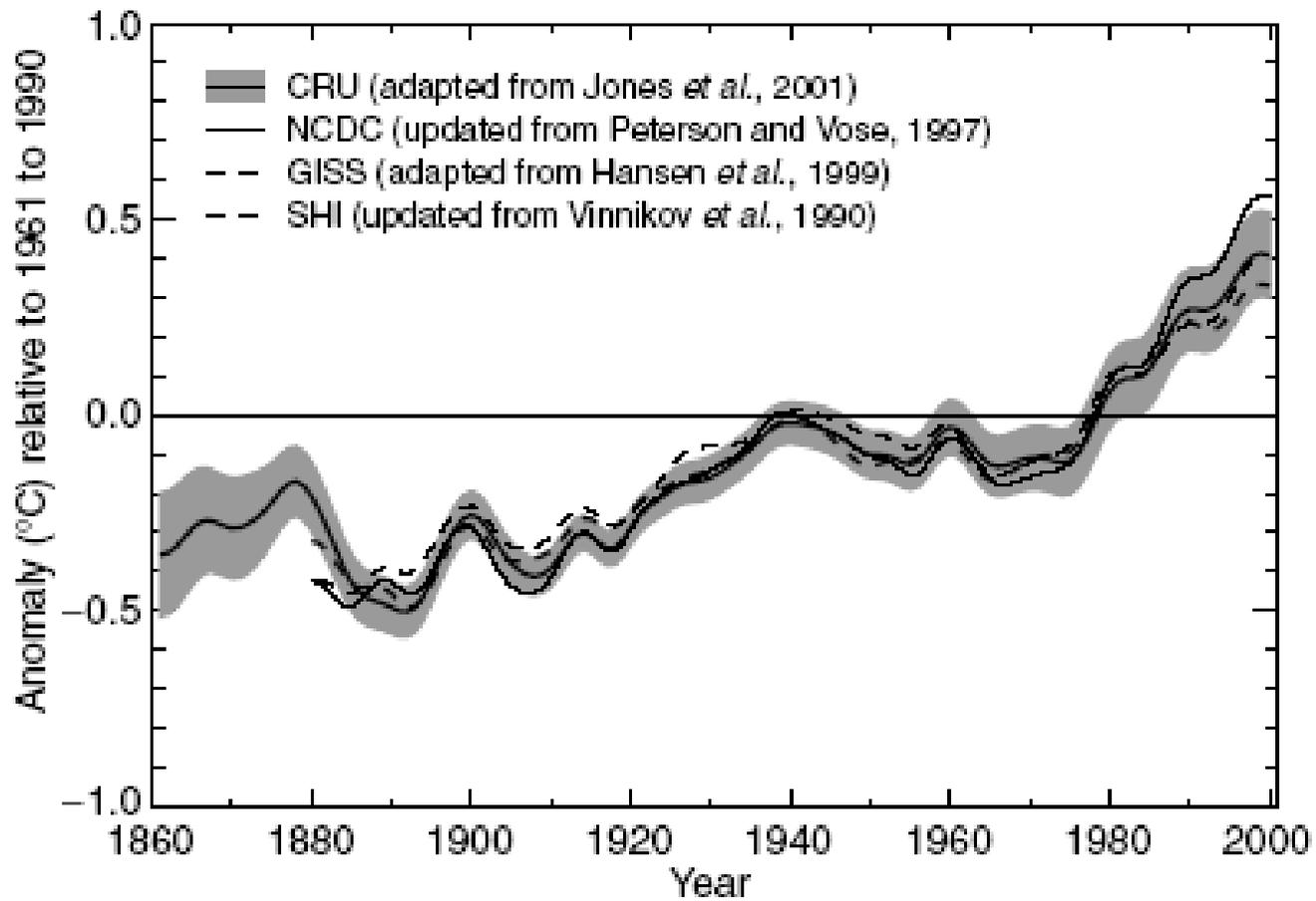
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- “[Bush’s] plan to cut GHG intensity 18% by 2012 addresses the long-term challenges of climate change.” –Mike Leavitt
  - Reality check
    - 4% emission reduction in 2012
    - 2% emission reduction by 2012
    - i.e. an actual emission increase of 13-15%

# Biased use of science b&s, anecdotes,

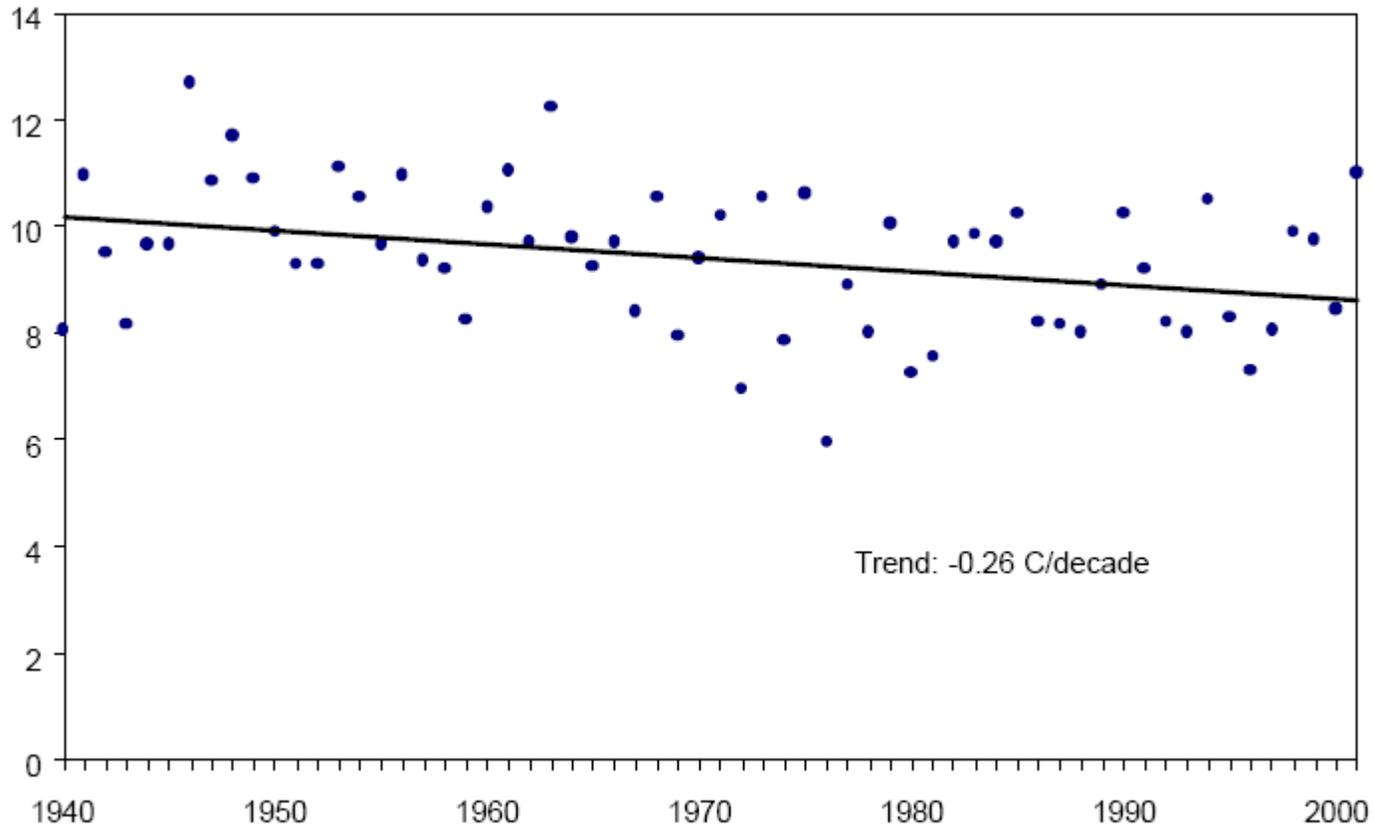


McIntyre & Mckitrick



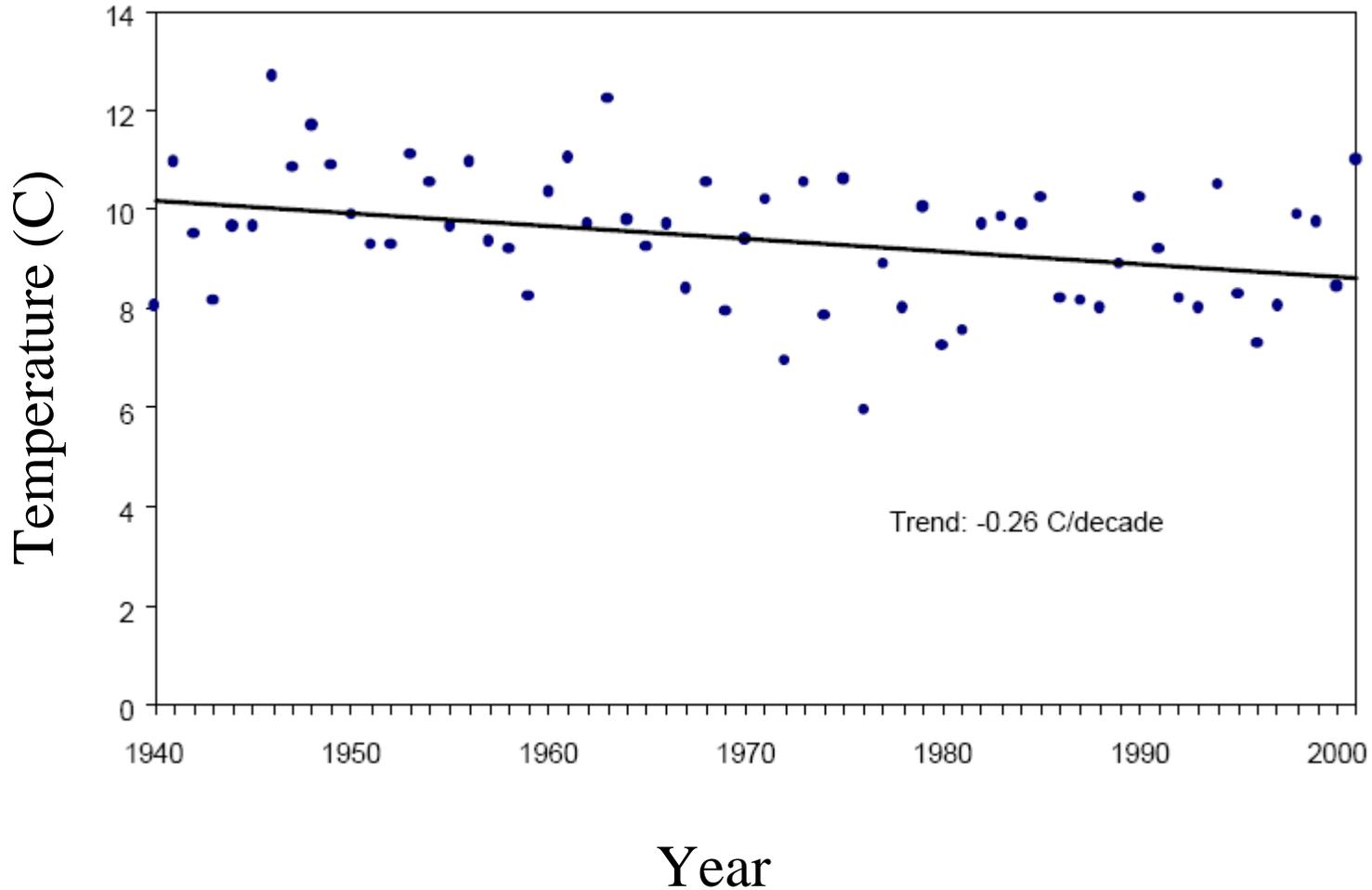
IPCC, (2001)

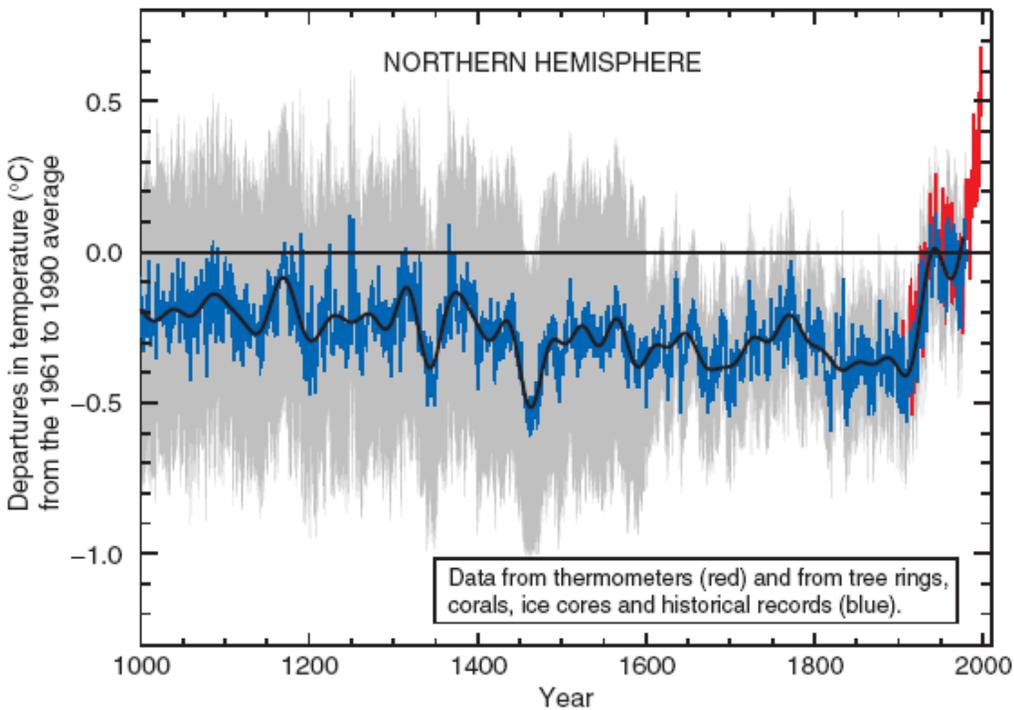
# Slide on politicizing science in general



# October-November Mean Temperatures 1940-2001

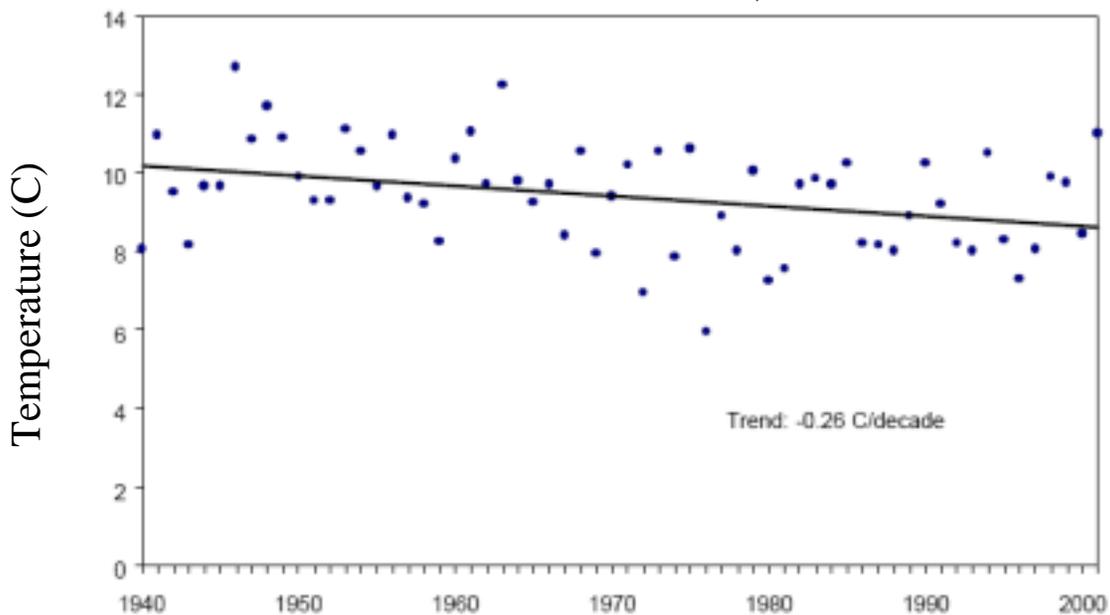
## Erie, Pennsylvania





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