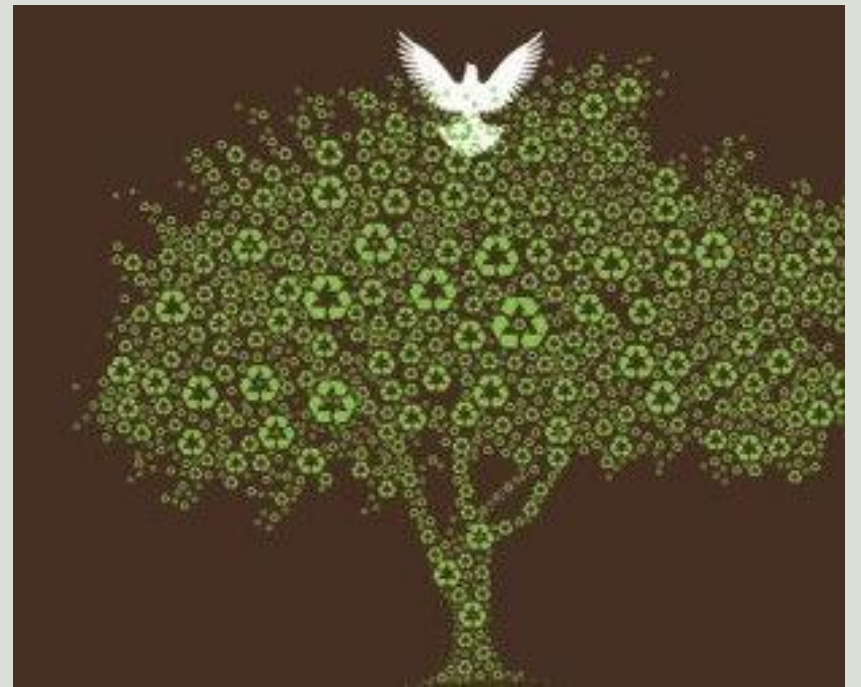


CLIMATE CHANGE

SCIENCE AND FAITH IN CONFLICT?

KATHARINE HAYHOE
TEXAS TECH UNIVERSITY

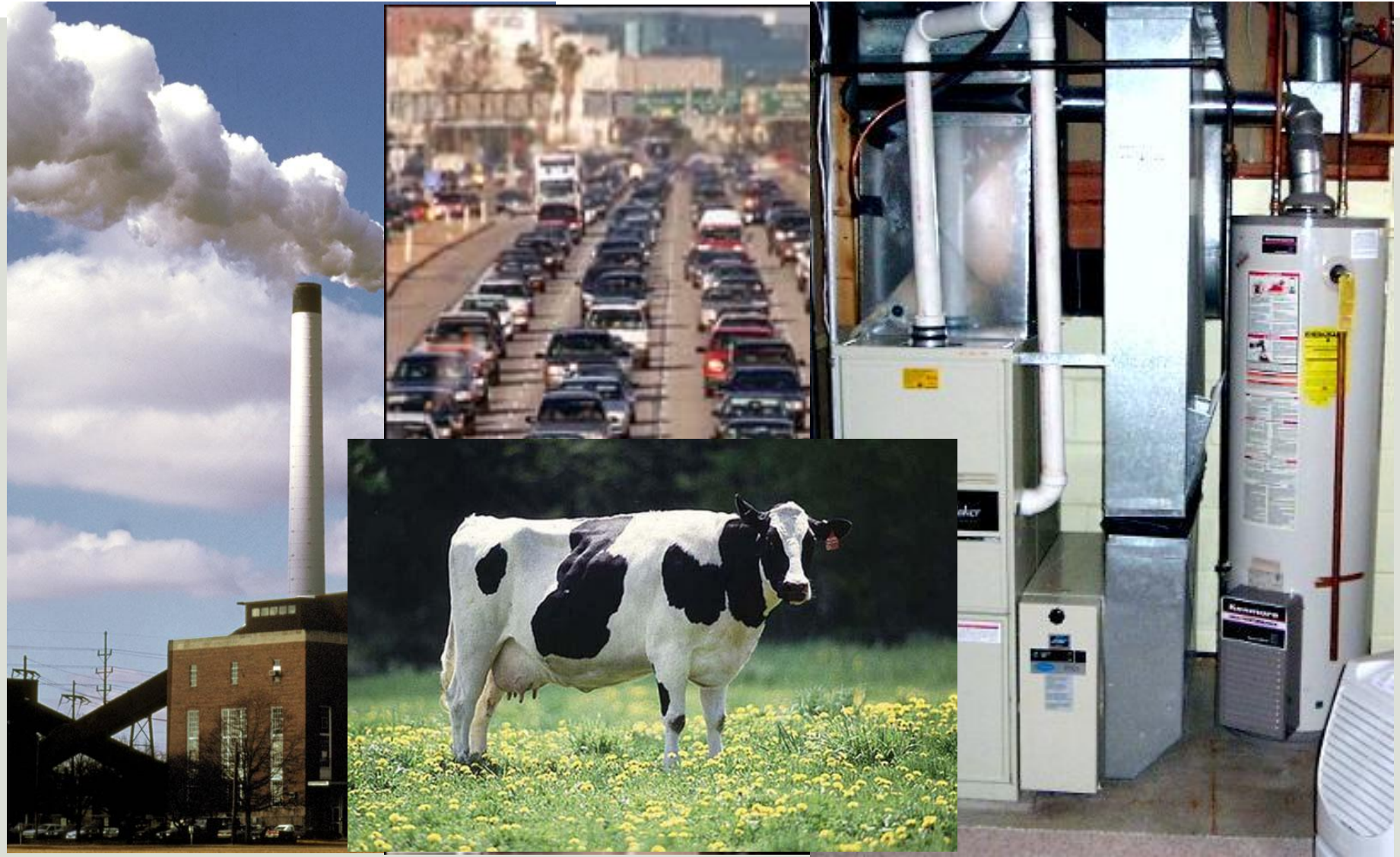


THE PROBLEM

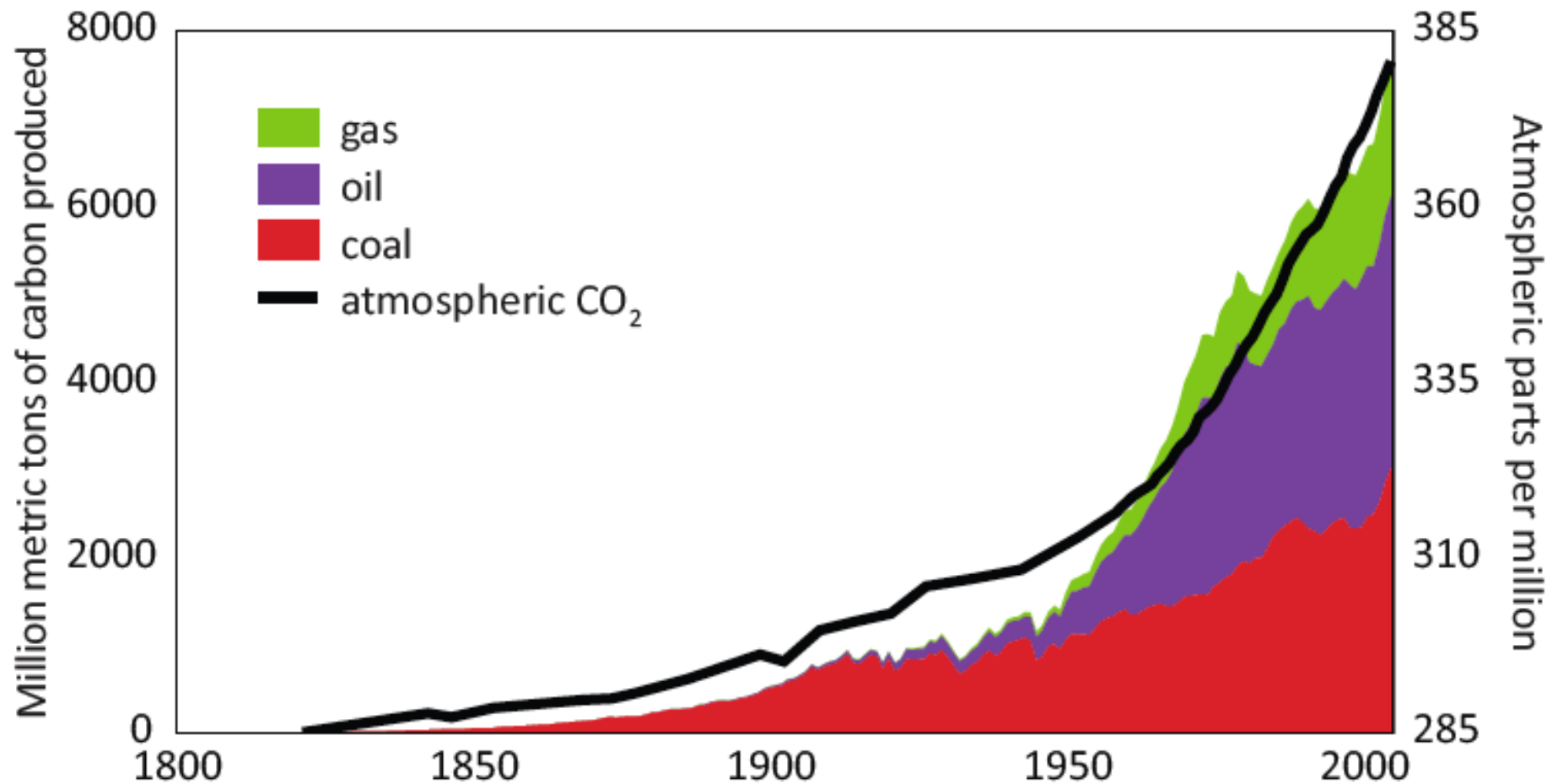


PART ONE

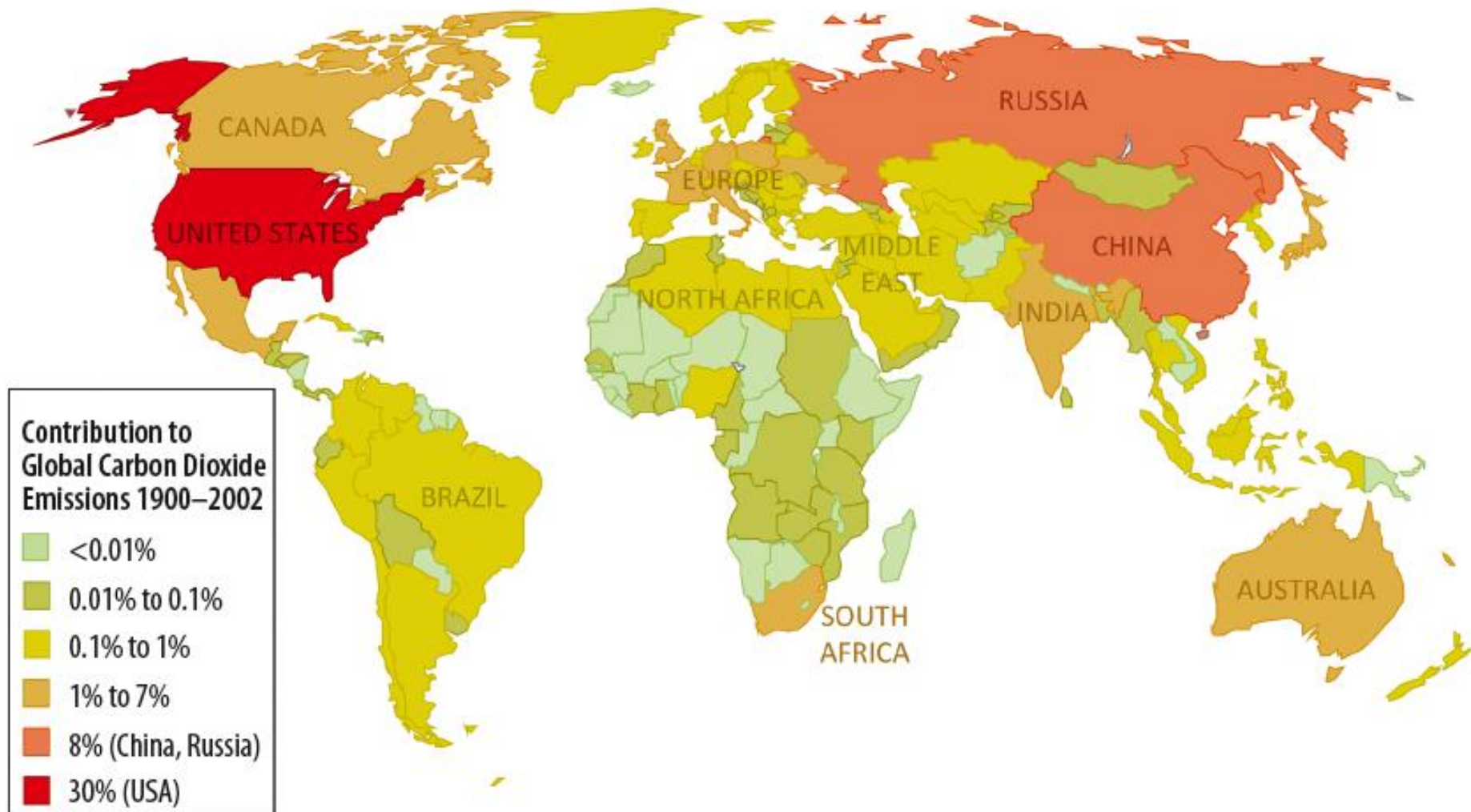
Our activities produce heat-trapping gases



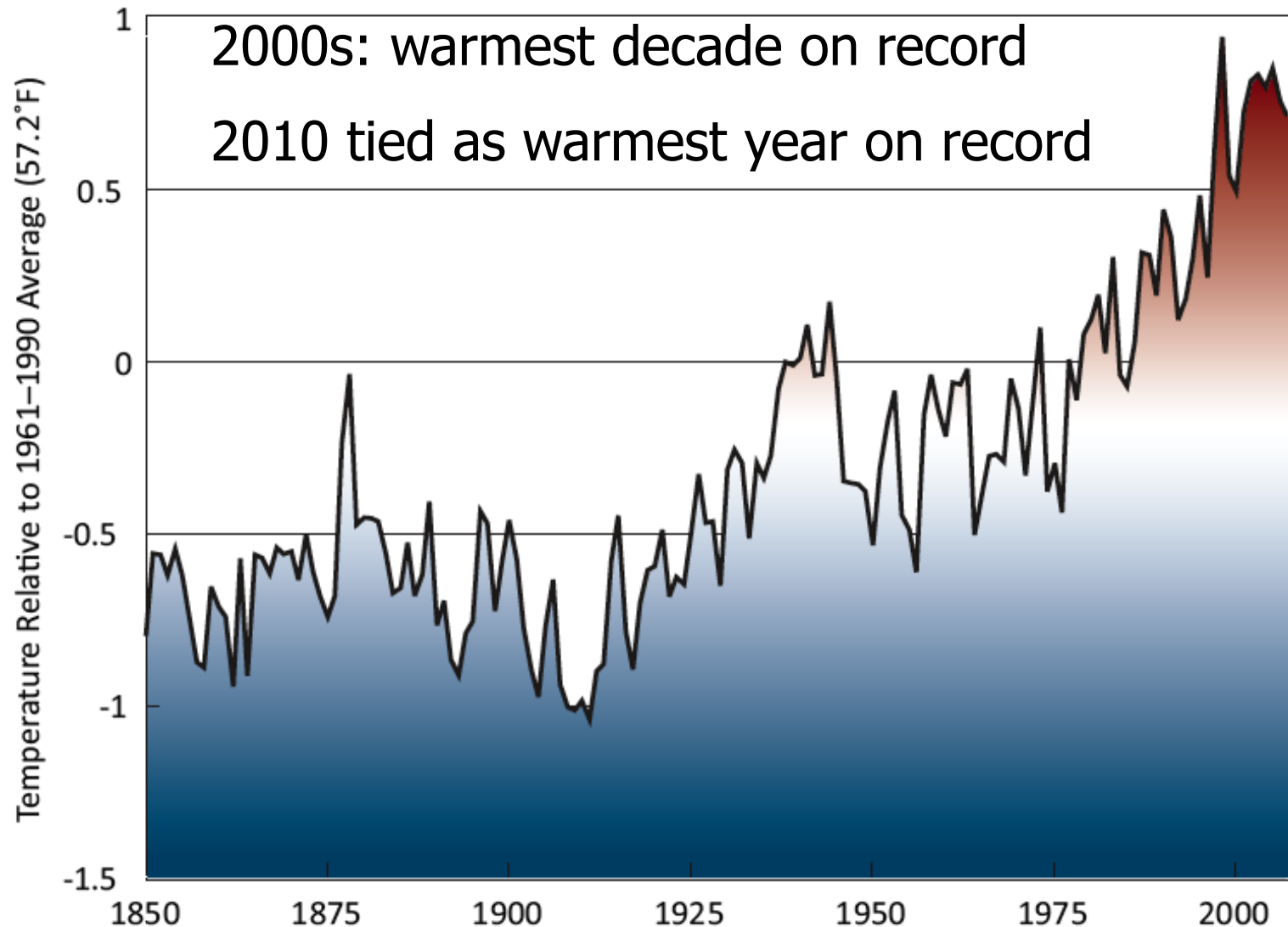
These gases are building up in the atmosphere



The U.S. is one of the biggest producers

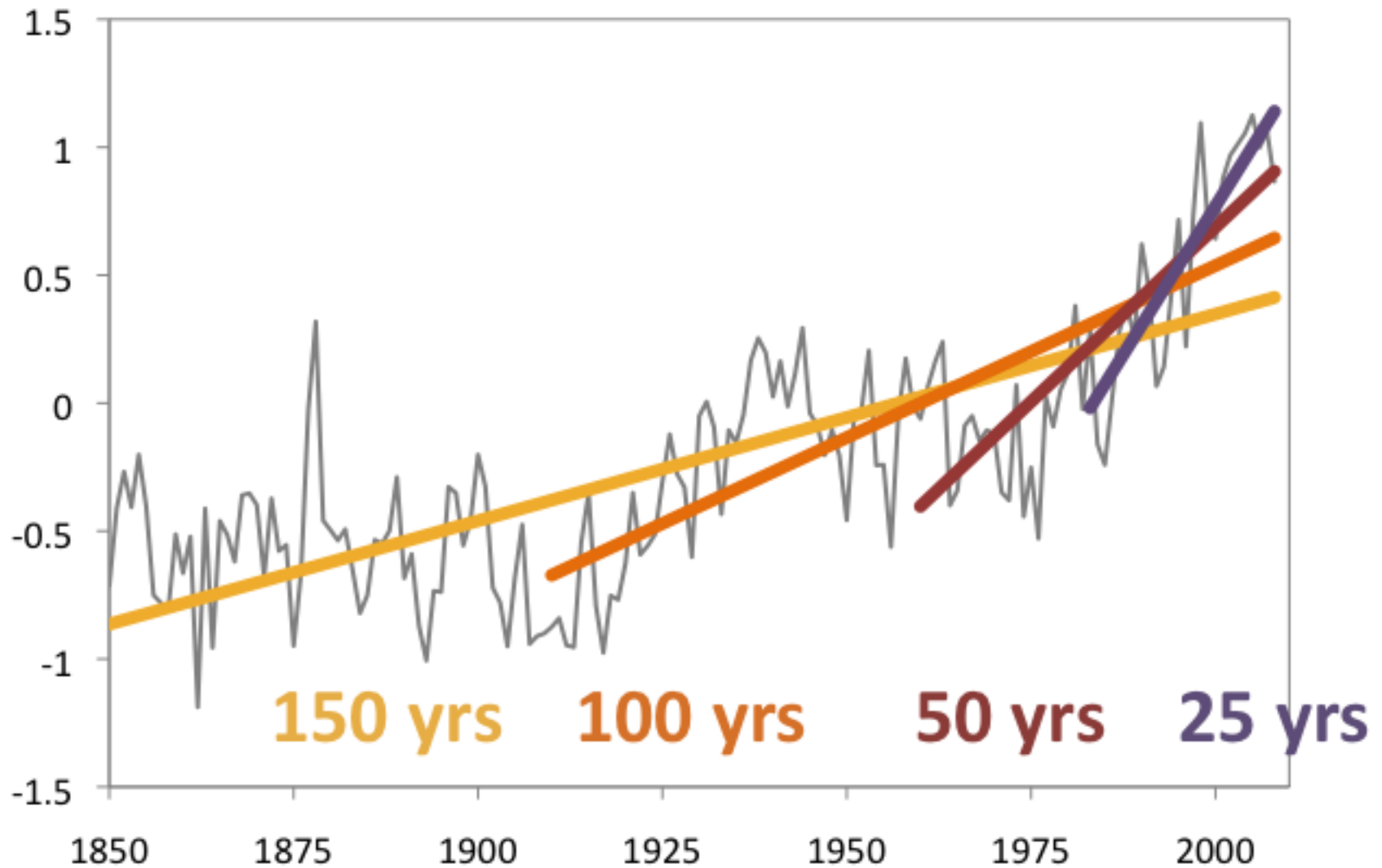


These gases trap heat in the atmosphere



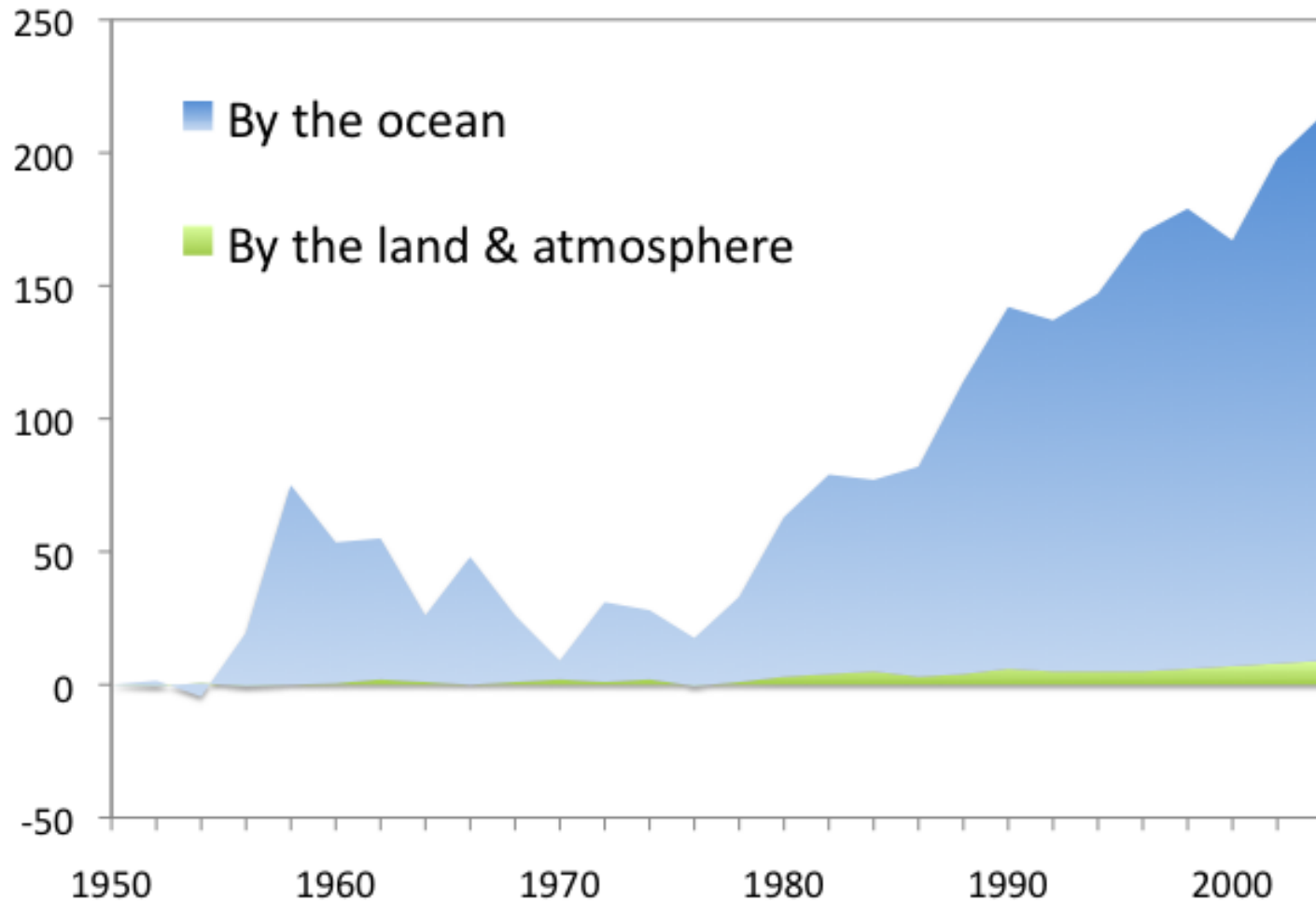
Earth's temperature is rising faster and faster

Temperature relative to the 1961-1990 average (°F)

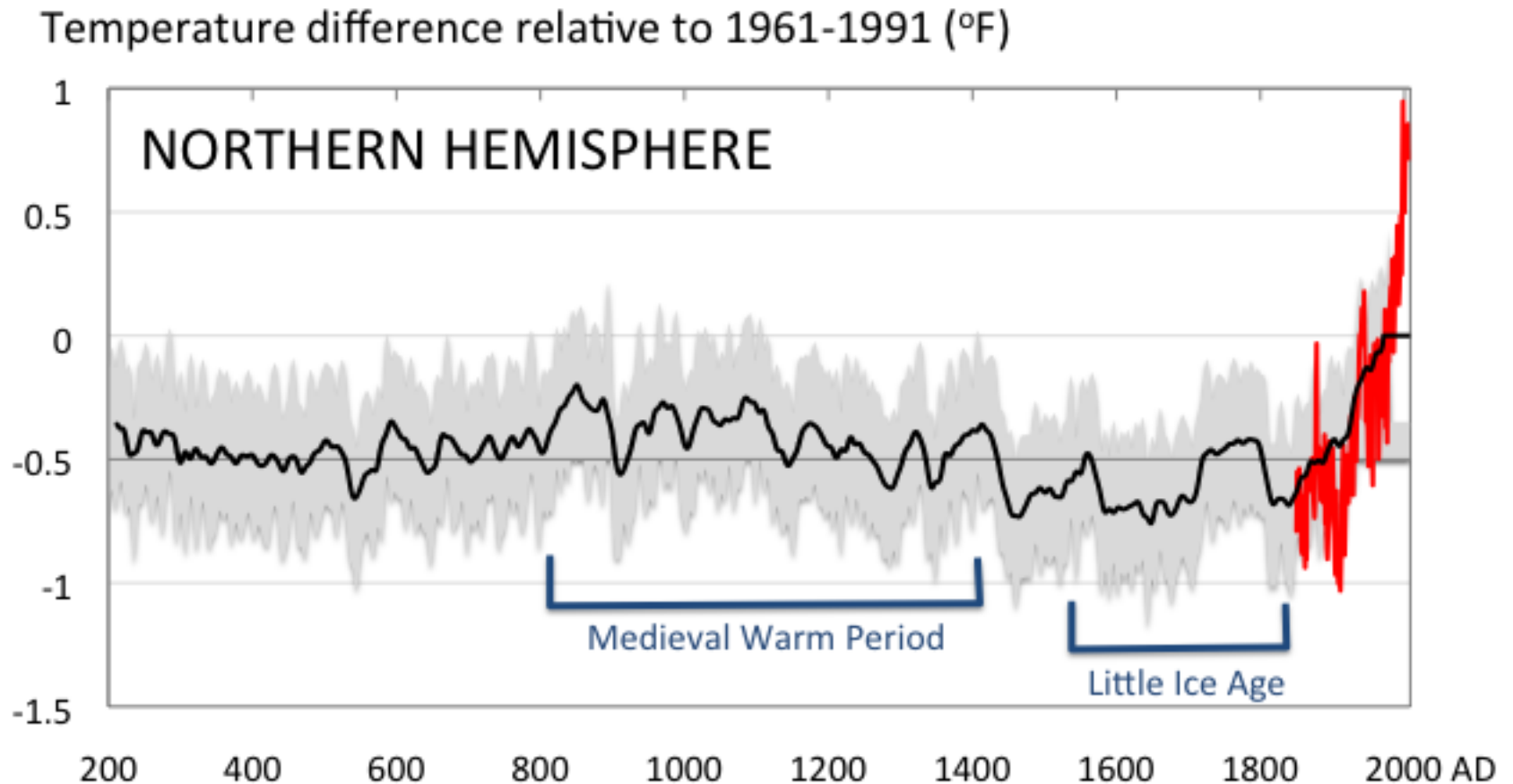


And this is just a fraction of total heating ...

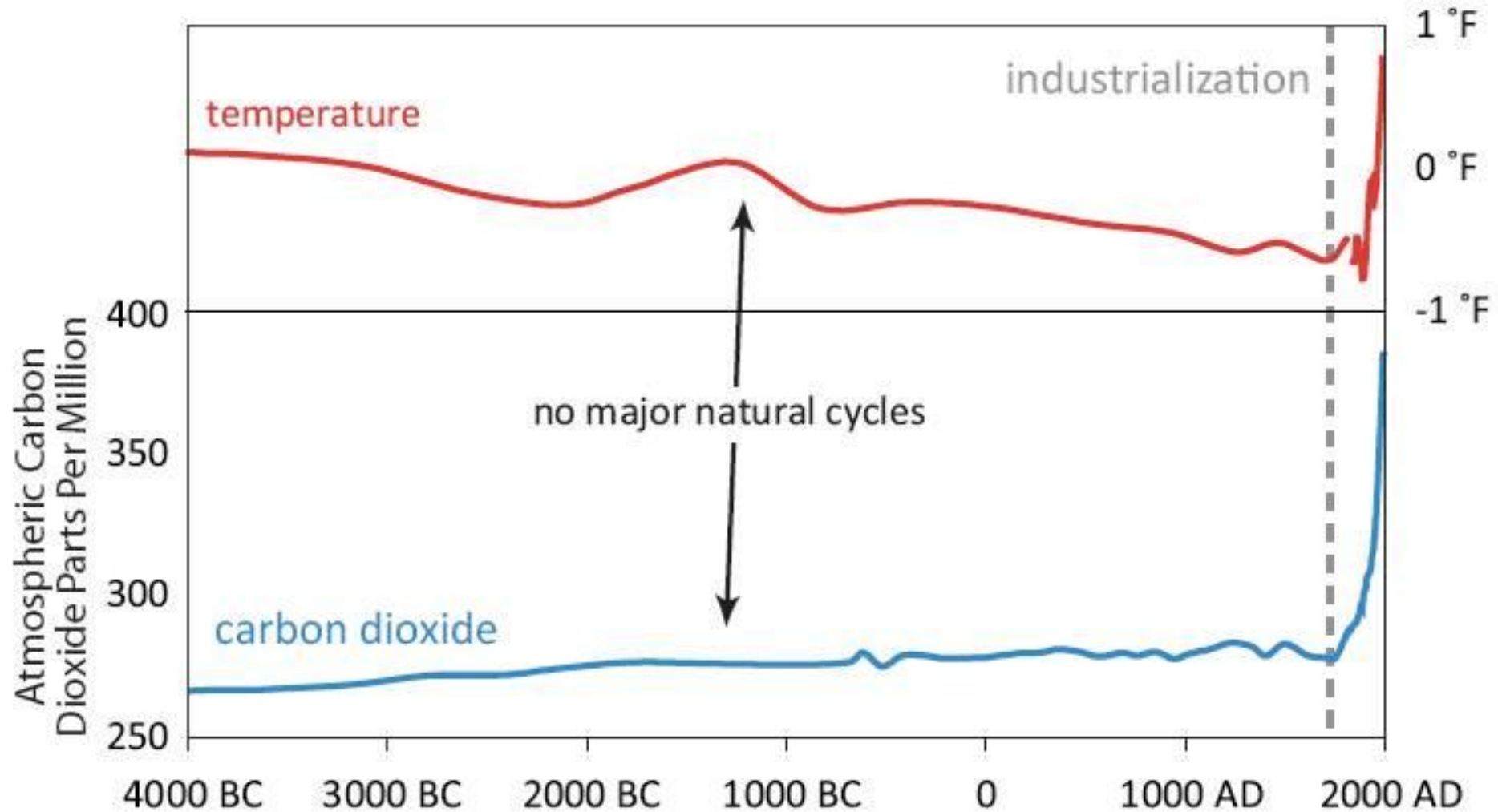
Increased Heat Absorbed by the Earth (10^{21}J)



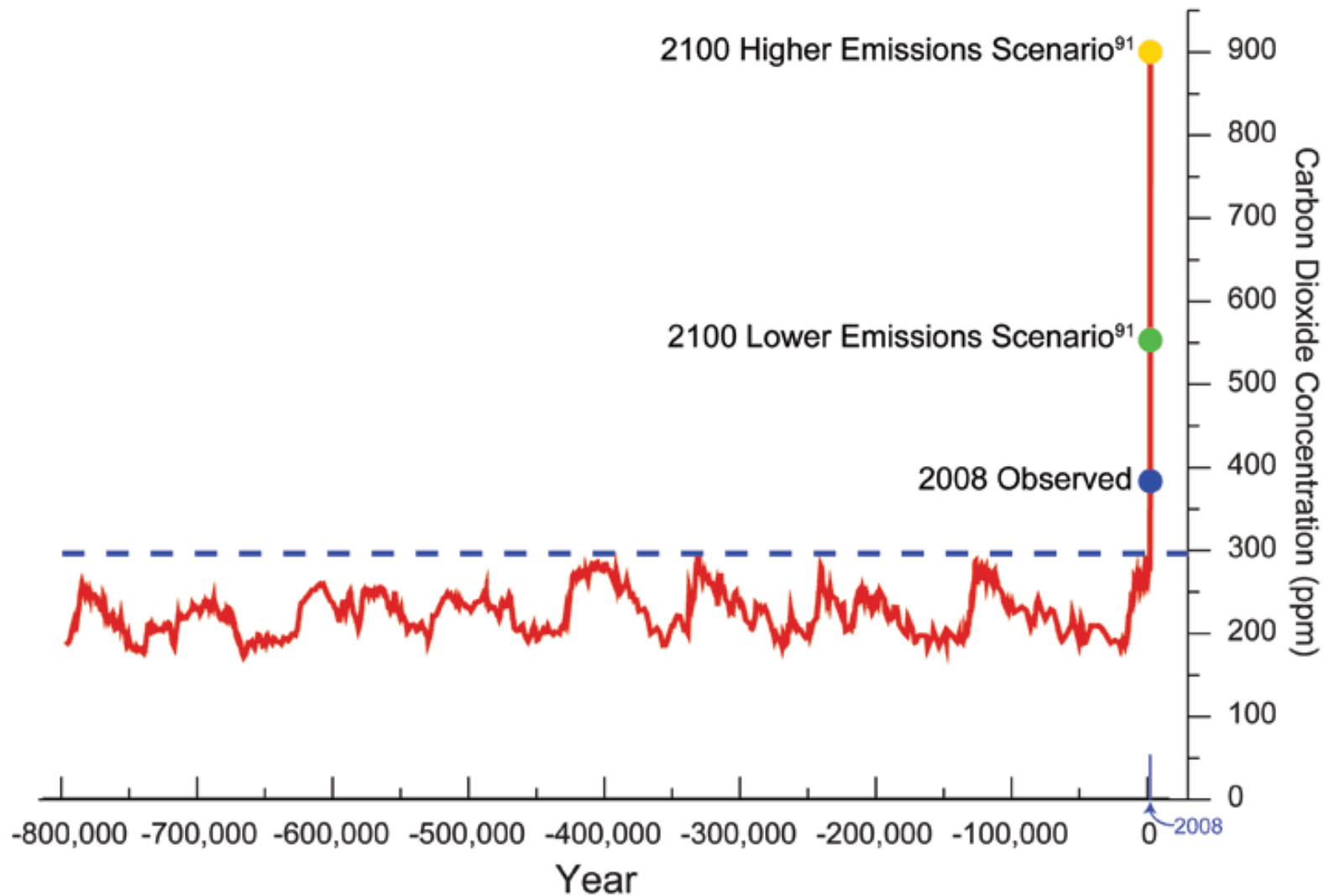
Conditions today are unusual in the context of the last 2,000 years ...




... the last 6,000 years



... and even the last 800,000 years



Our world is changing rapidly



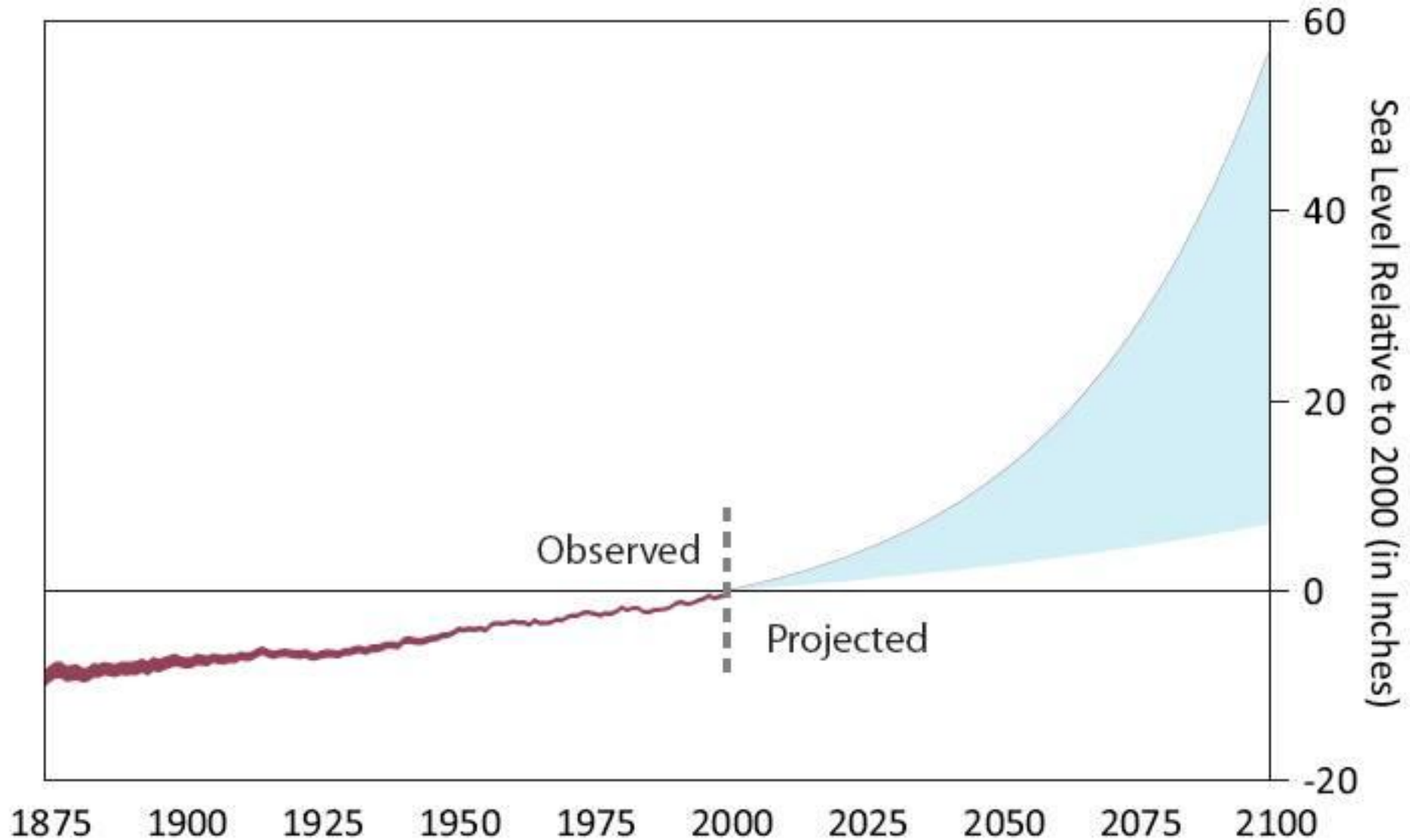
Responses to warming temperatures seen in more than 25,000 physical and biological systems around the world.

Rosenzweig et al. 2008

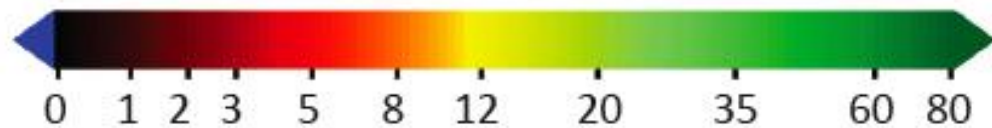
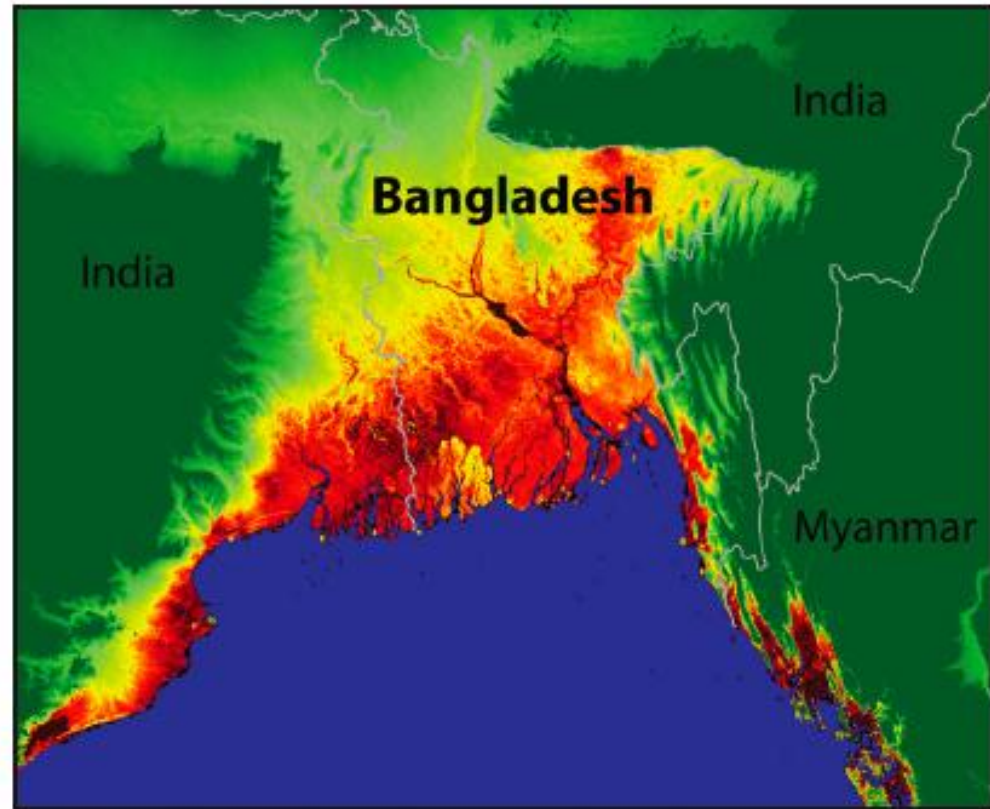
Sea level rise is accelerating, as ice sheets melt



2 to 5 ft of sea level rise likely by 2100



What does this mean ... for our coasts?



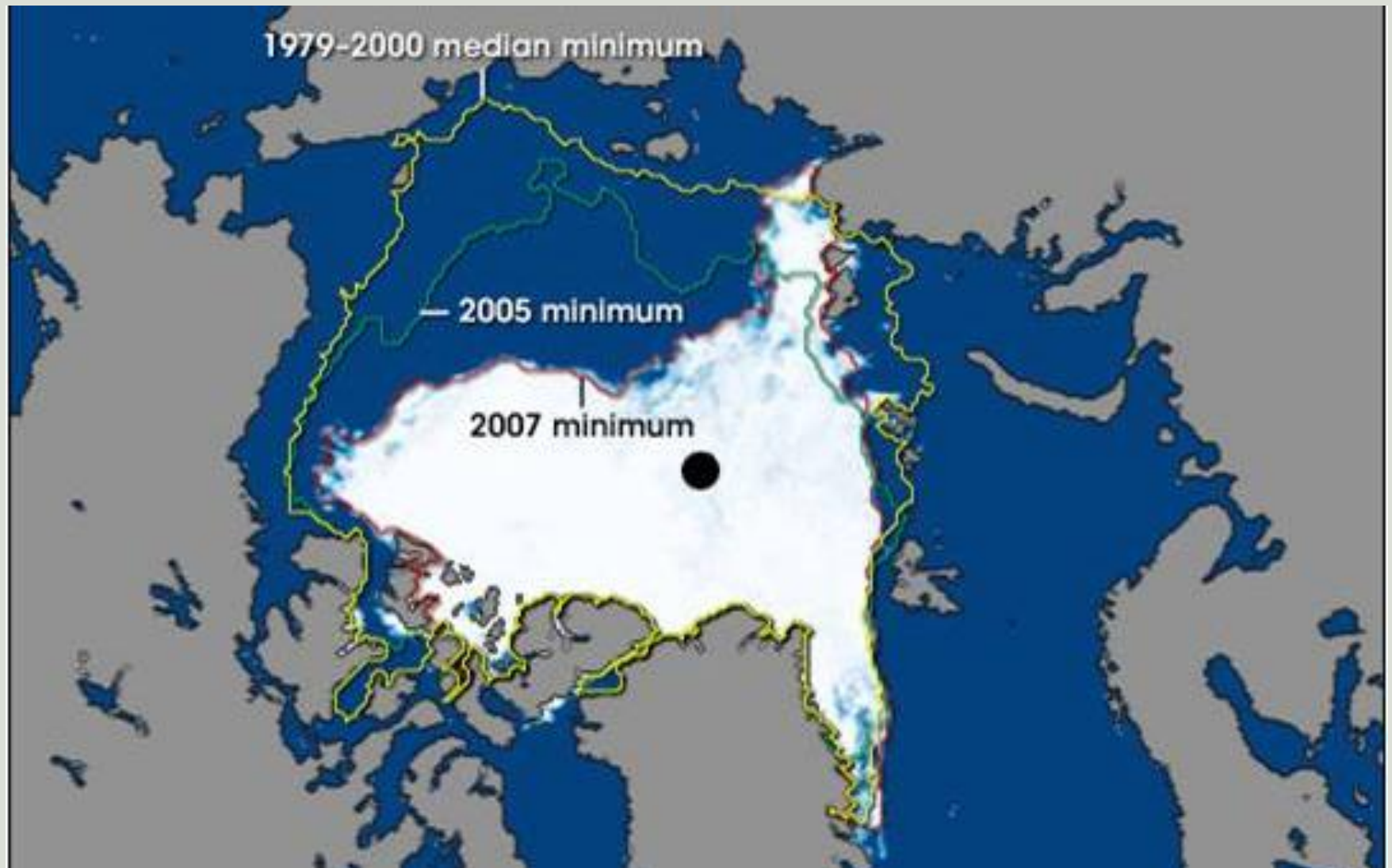
Height Above Sea Level (m)

... and even entire nations?

Tuvalu, South Pacific



Arctic is changing, as sea ice shrinks



America's first climate refugees



Frozen ground is melting & eroding



The people of Newtok, AK
have already been driven from
their homes.

Kivalina may be next.

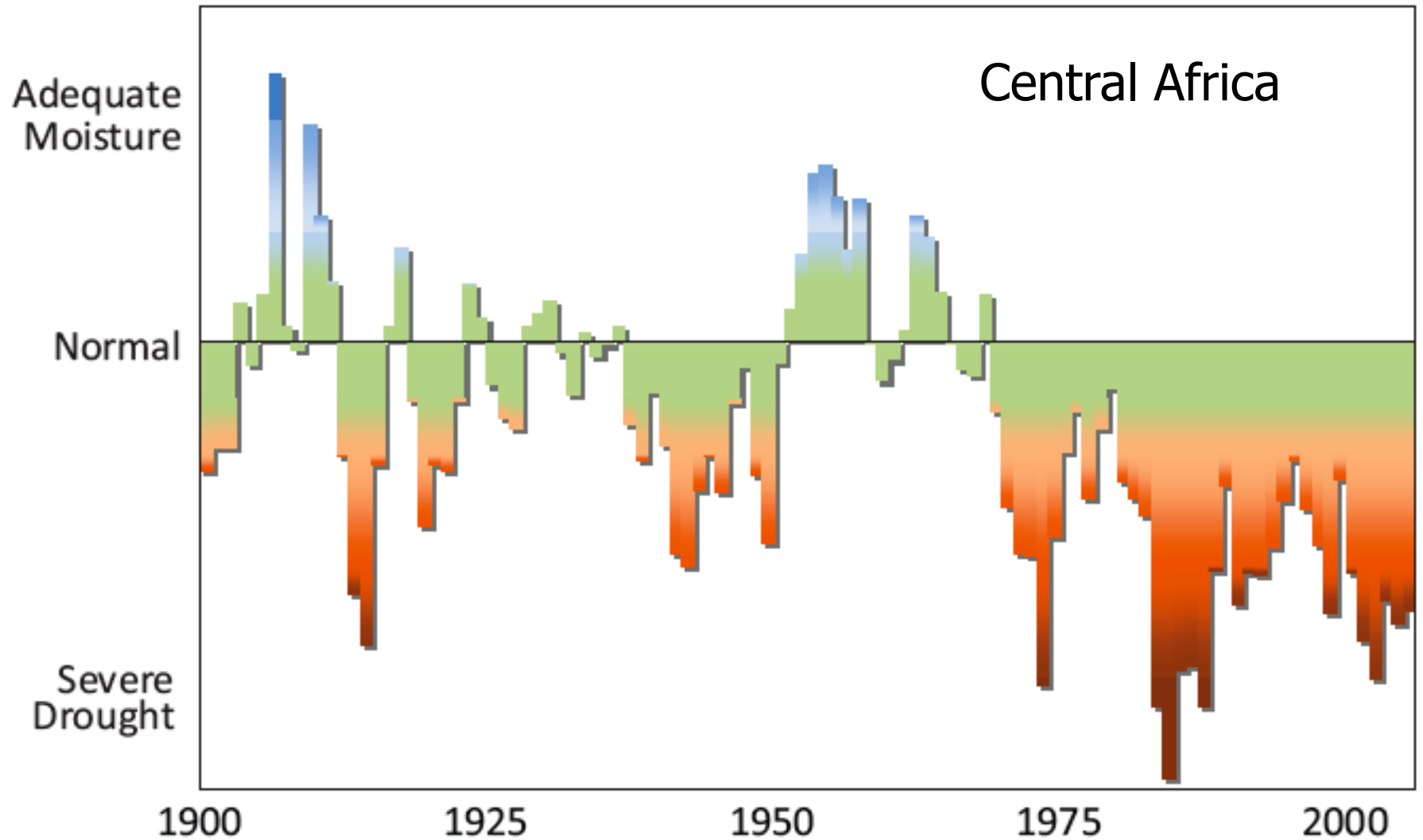
Water resources are disappearing



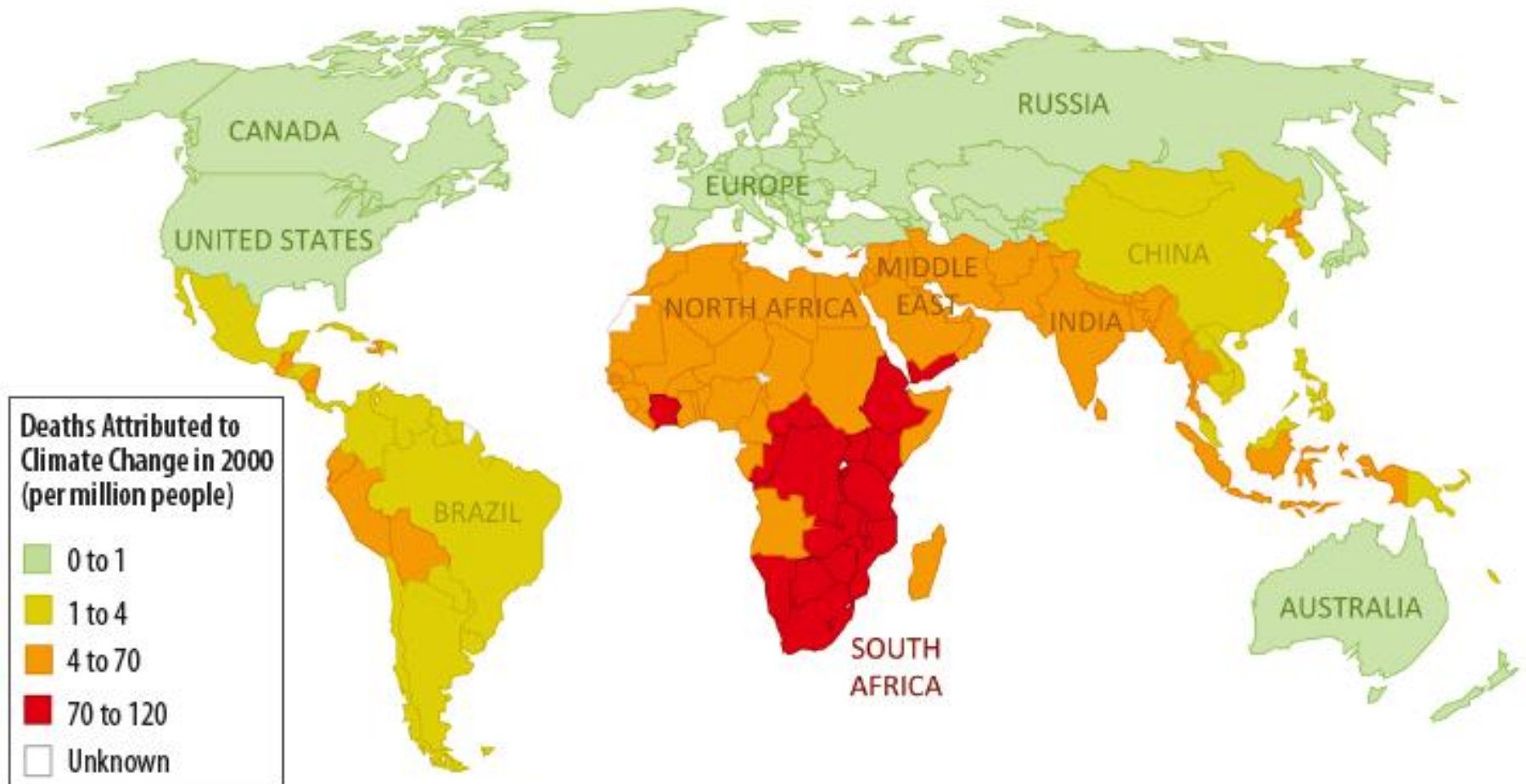
LIMA, PERU
8 million people
less than 2" rain per yr

1 billion depend on
glacier melt for
water

Precipitation patterns are shifting



Health risks are on the rise



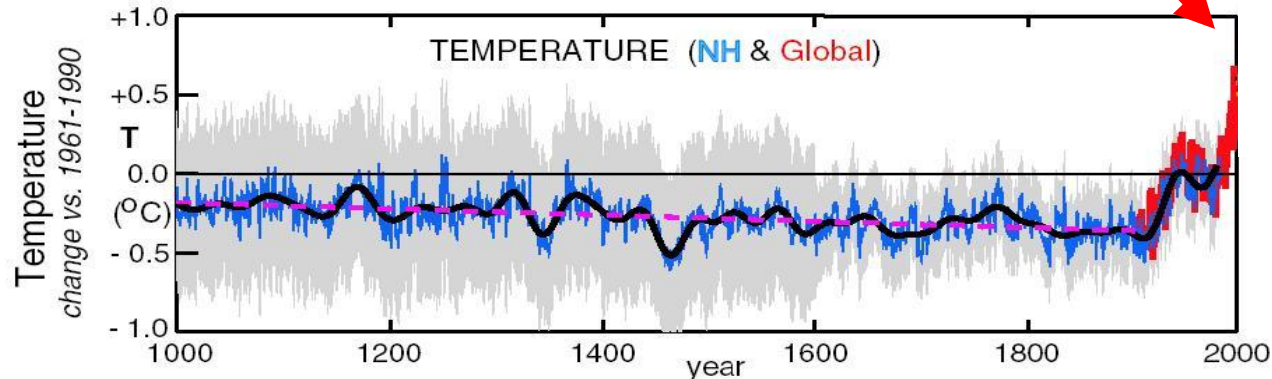
In 2000: 150,000 deaths per year

In 2009: 300,000 deaths per year

300 million already at risk from climate change

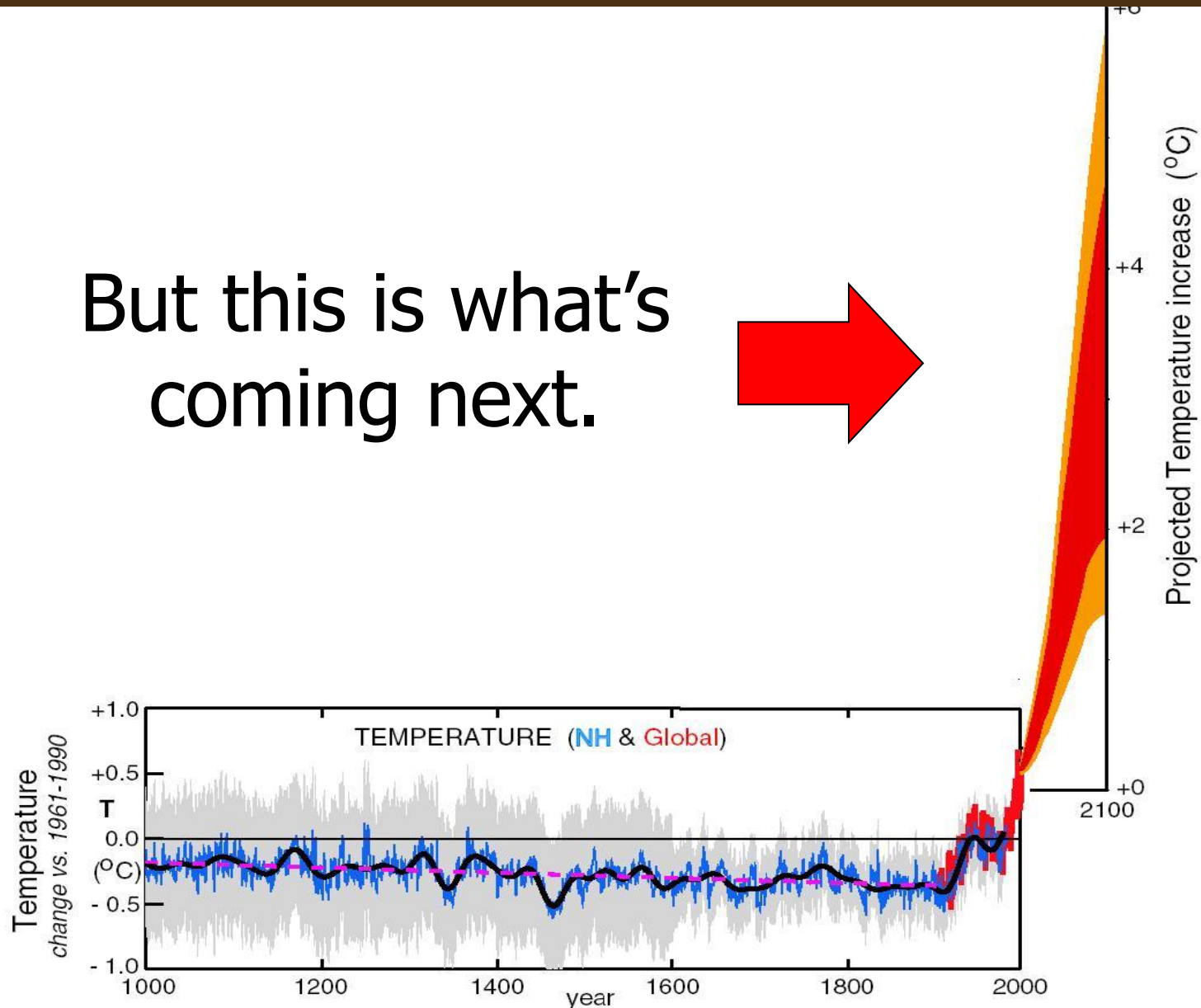
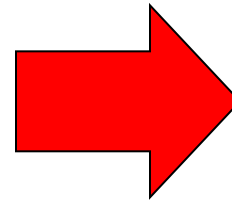
What can we expect in the future?

We're already
concerned about this

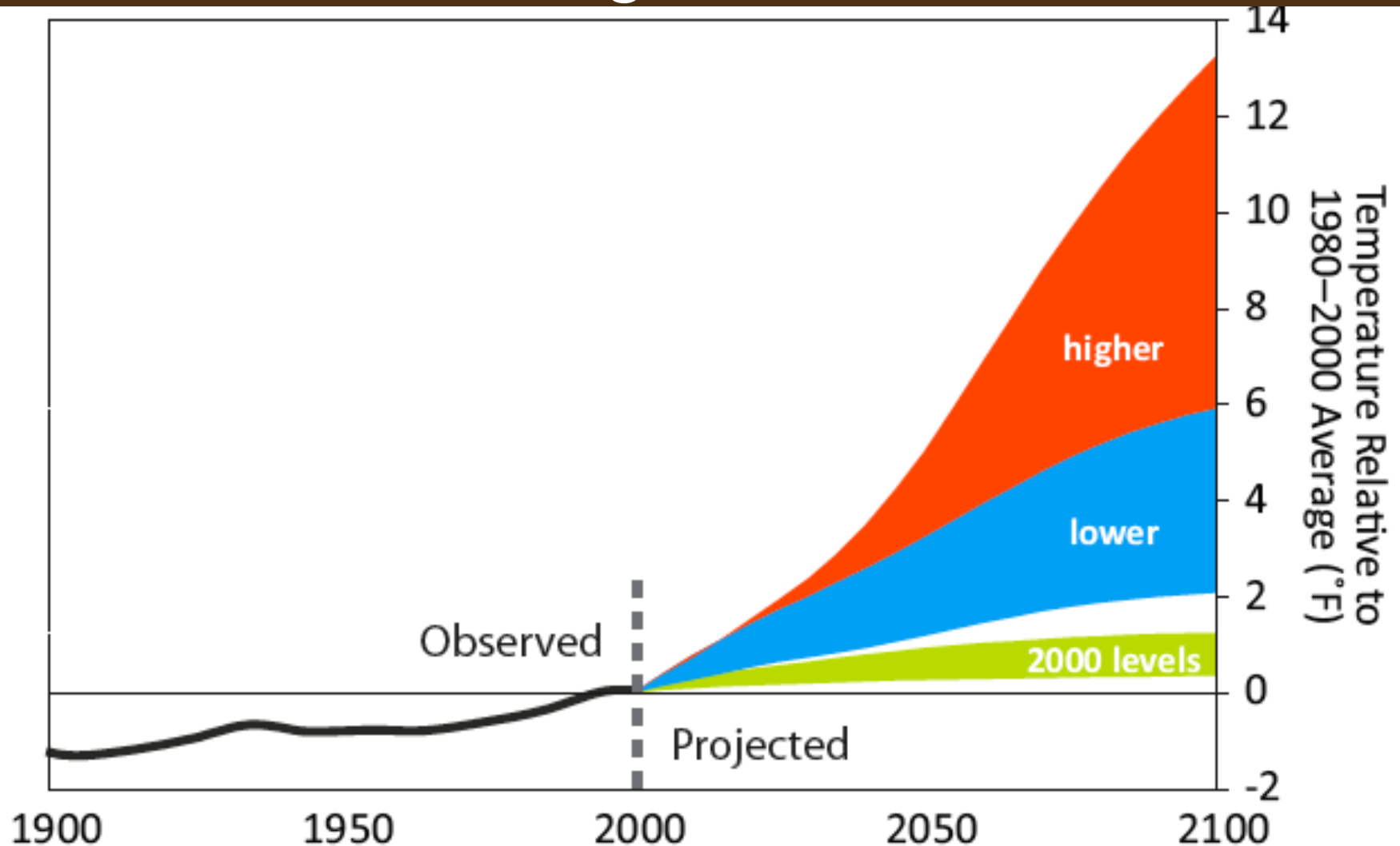


What can we expect in the future?

But this is what's
coming next.

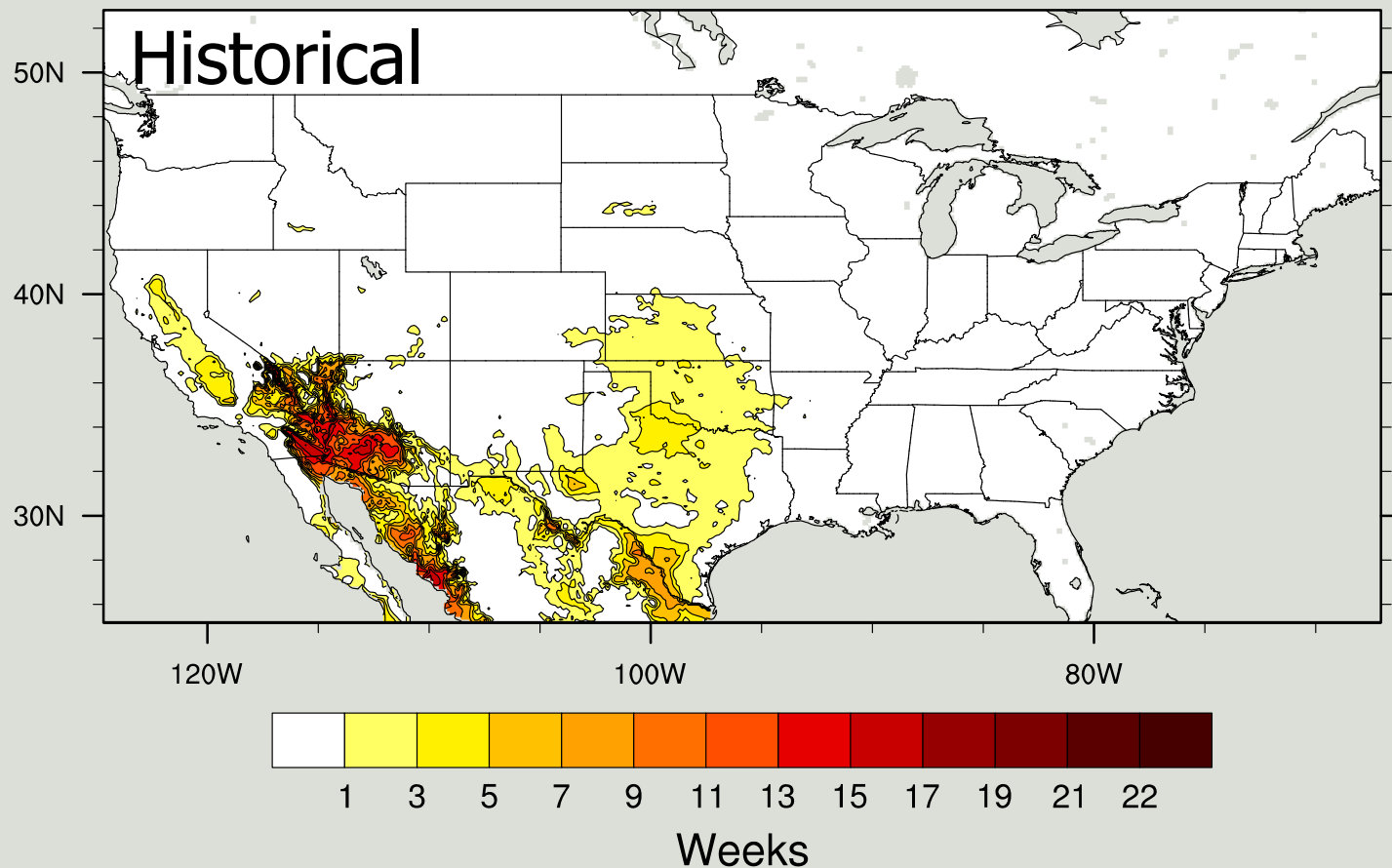


We have a (very) narrow window of time to determine how climate change will affect our own and future generations



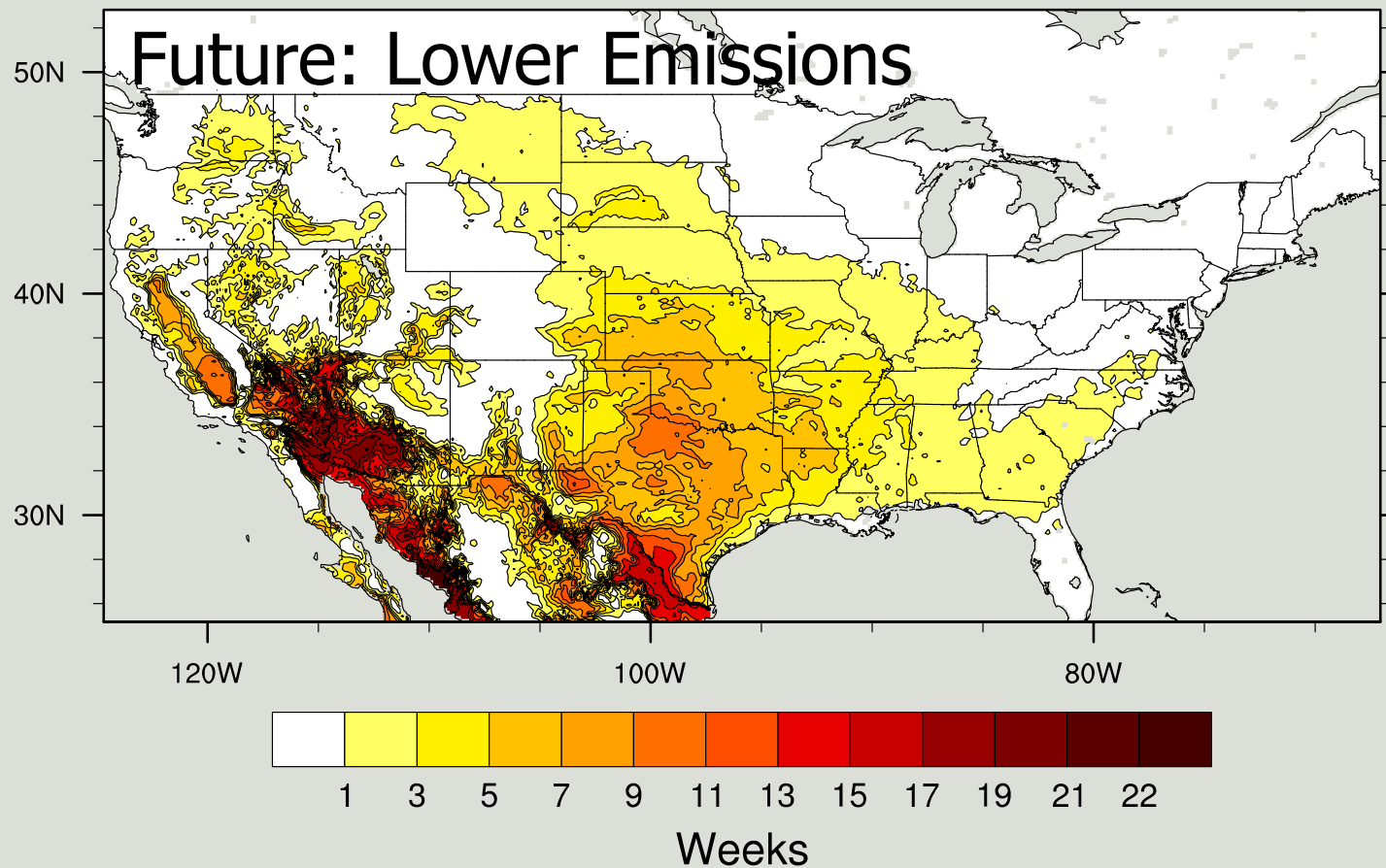
What does this mean ... for the US?

Weeks per Year $> 100^{\circ}\text{F}$ (38°C)



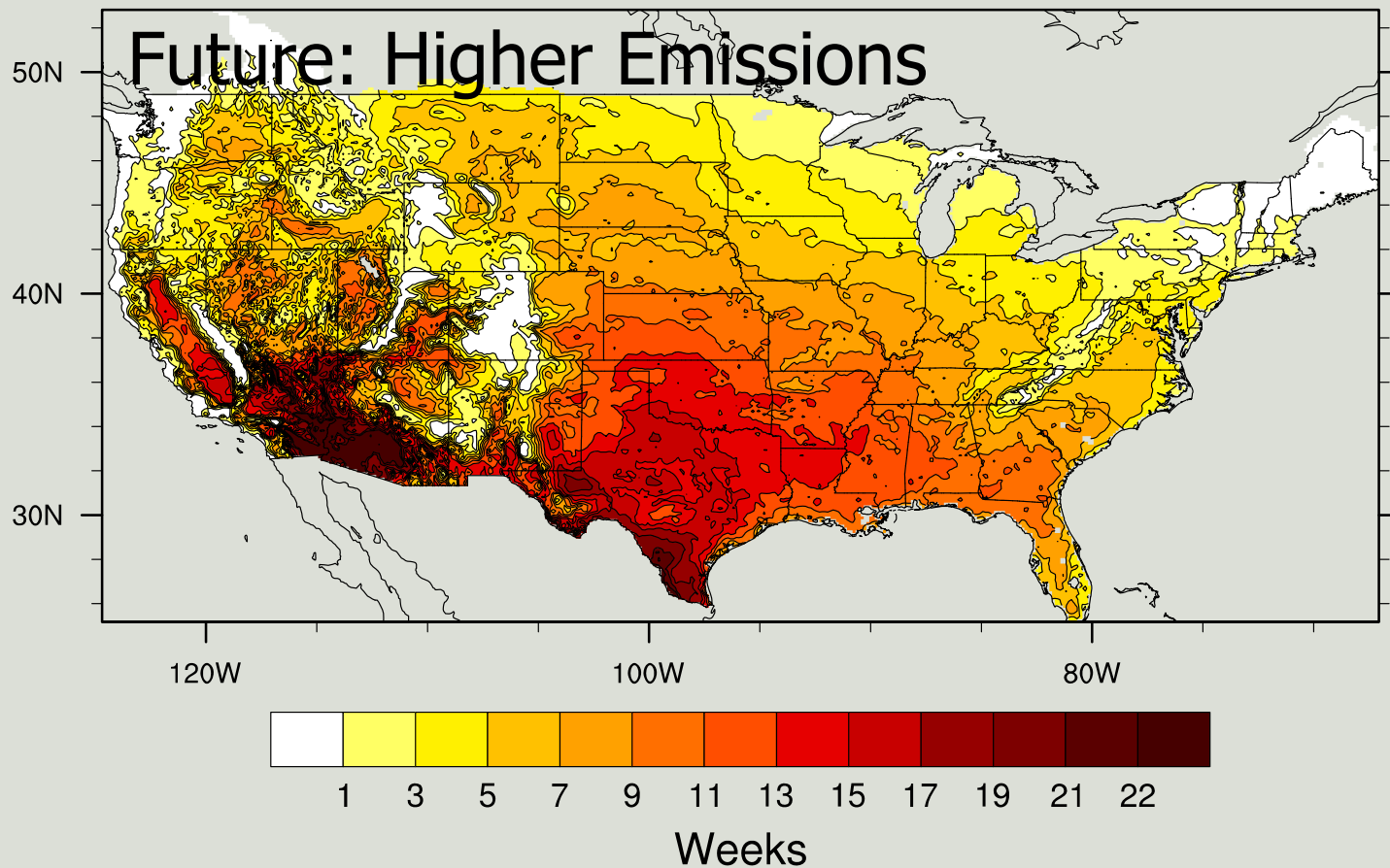
What does this mean ... for the US?

Weeks per Year $> 100^{\circ}\text{F}$ (38°C)

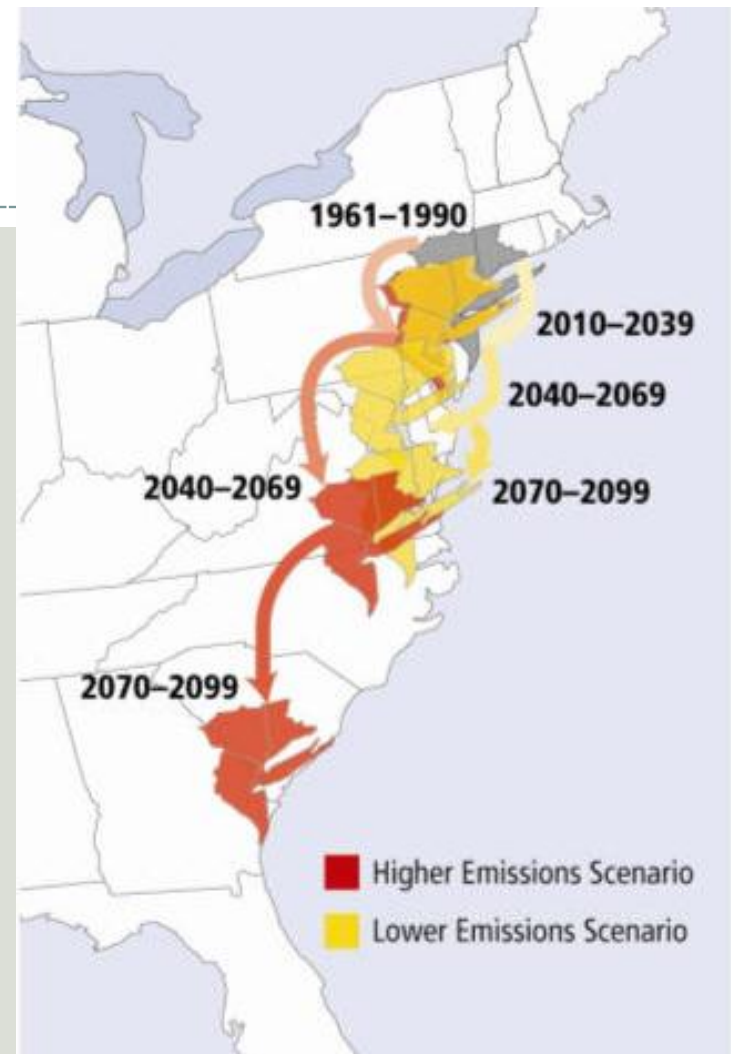
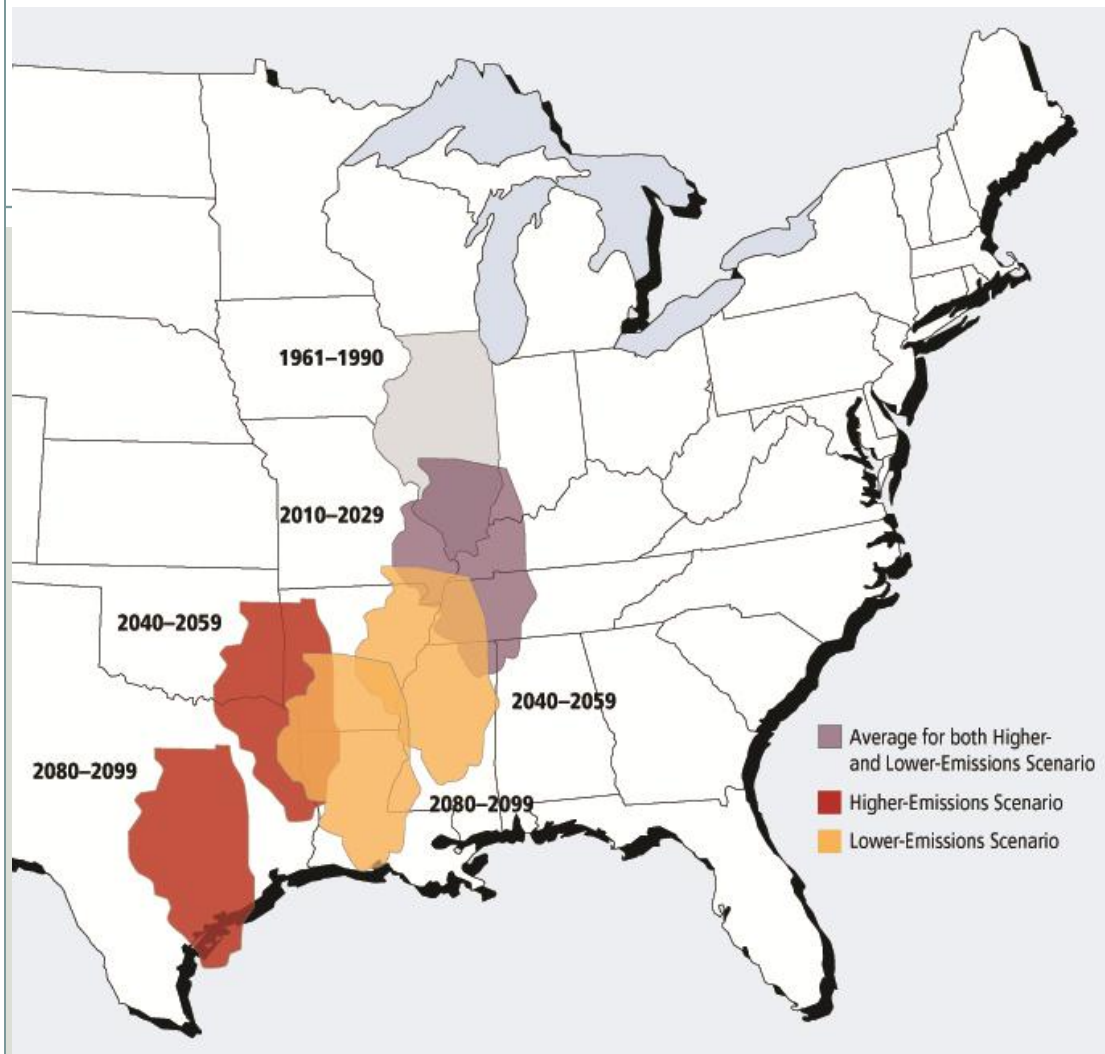


What does this mean ... for the US?

Weeks per Year $> 100^{\circ}\text{F}$ (38°C)



What does this mean ... for the US?

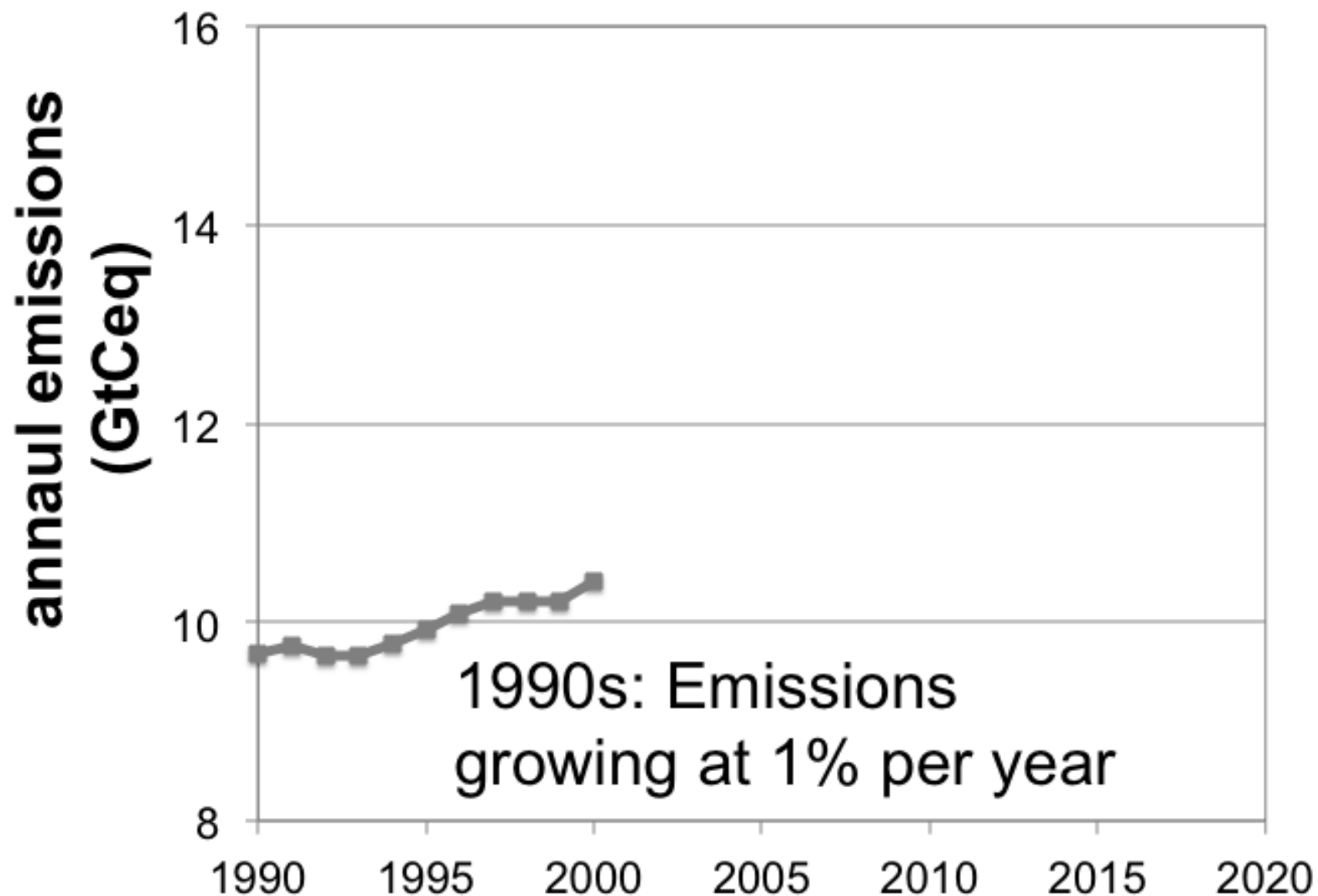


THE RESPONSE

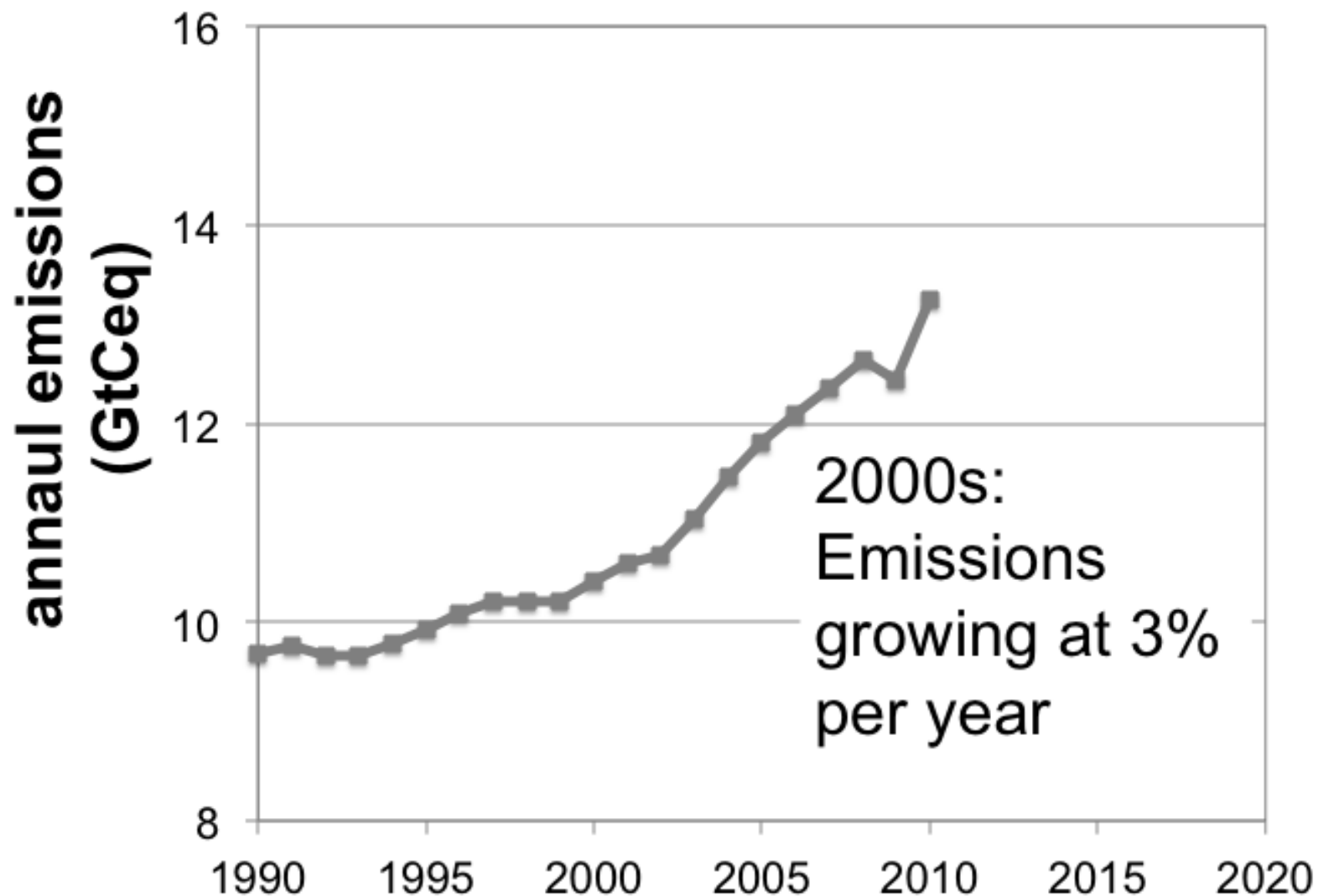


PART TWO

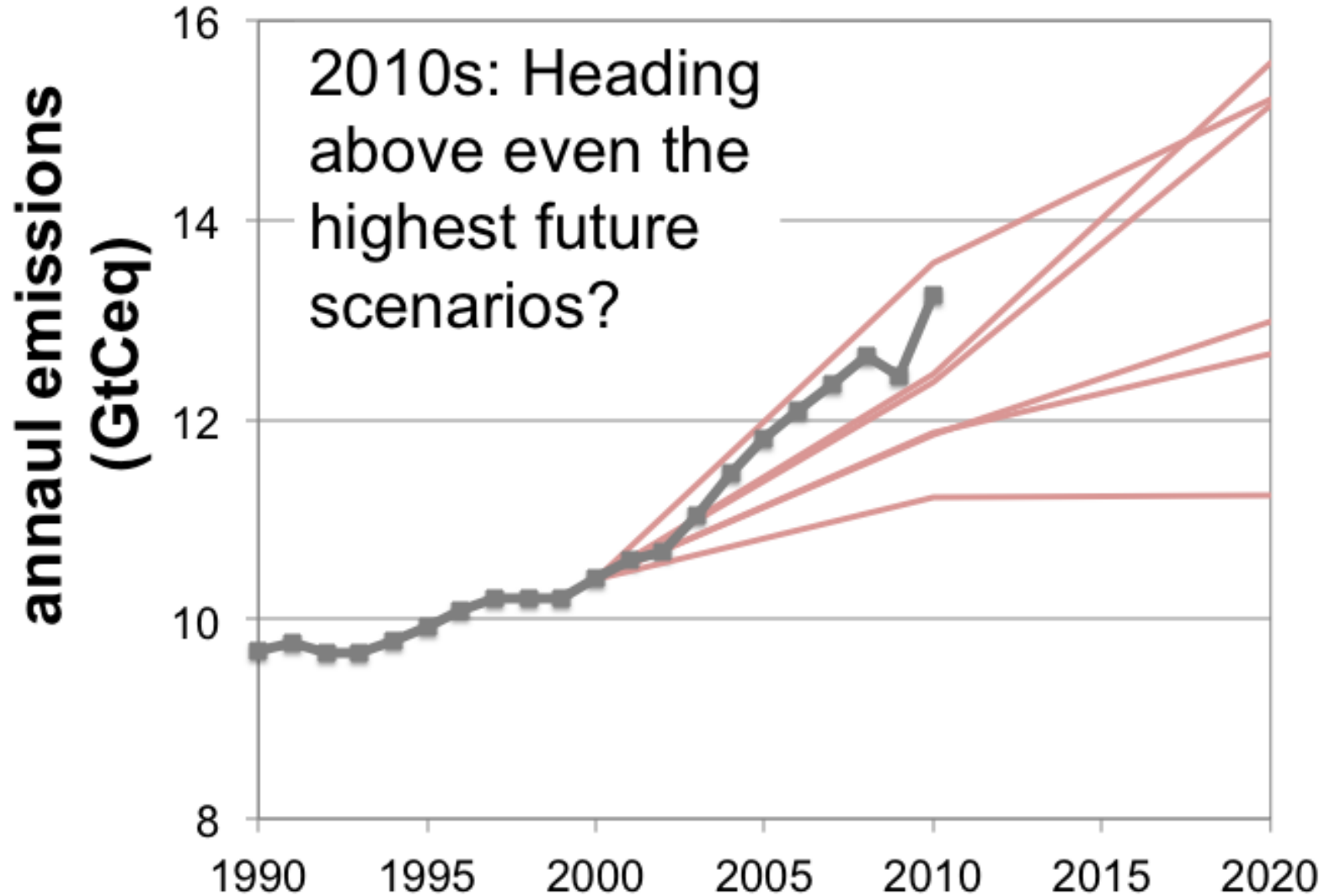
Emissions of heat-trapping gases



Emissions of heat-trapping gases



Emissions of heat-trapping gases

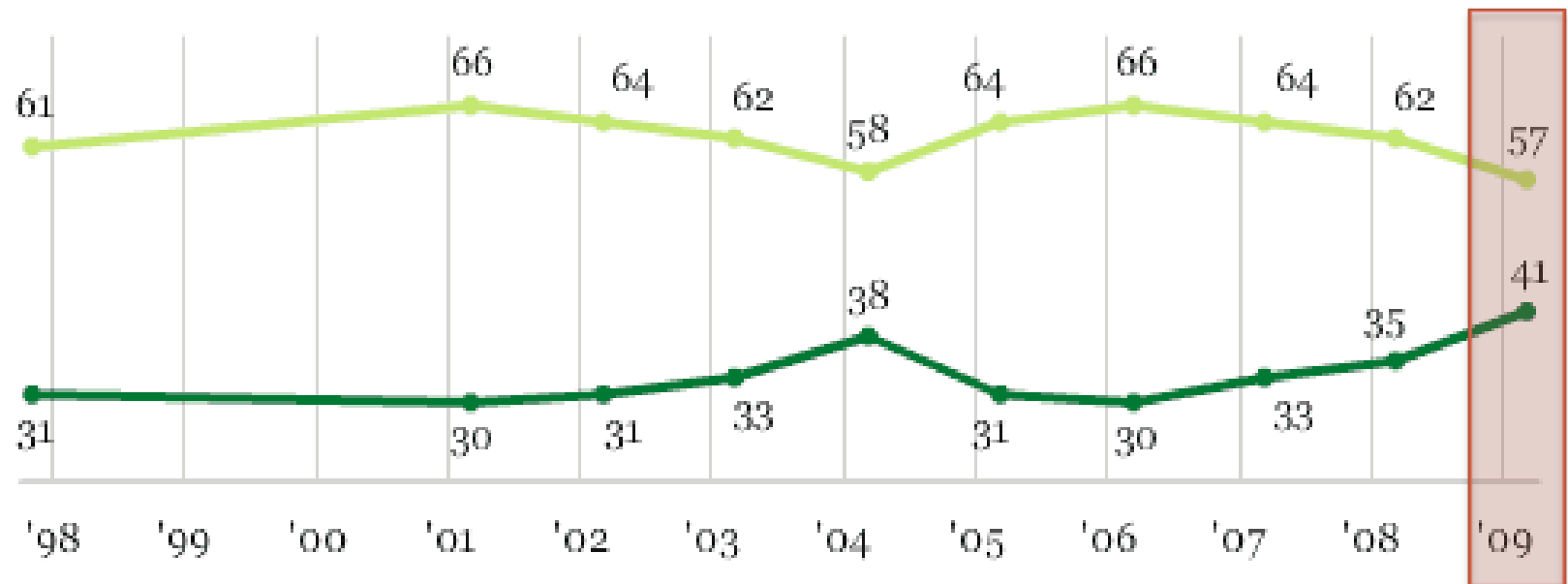


Doubt regarding the seriousness of global warming is at an all-time high

Thinking about what is said in the news, in your view is the seriousness of global warming -- [generally exaggerated, generally correct, or is it generally underestimated]?

■ % Exaggerated

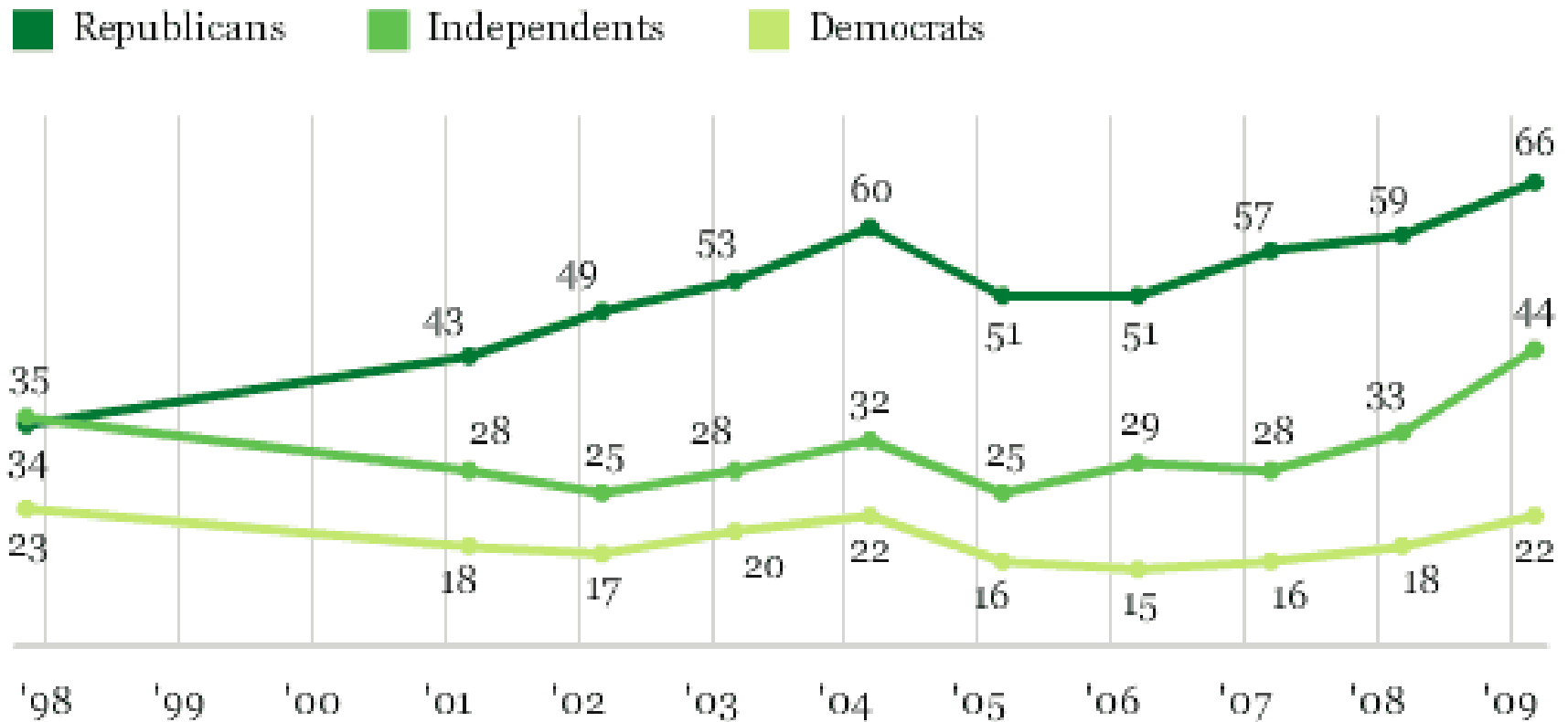
■ % Correct/Underestimated



GALLUP POLL

Perceptions tend to run along party lines ...

Percentage Saying News of Global Warming Is Exaggerated, by Party ID



GALLUP POLL

... and along religious lines.

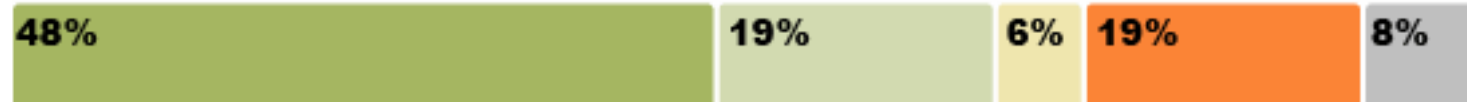
Is there solid evidence the earth is warming?

■ **Yes**, because of human activity ■ **Yes**, because of natural patterns ■ **Yes**, but don't know cause ■ **No** ■ Mixed evidence/Some evidence/Don't know

Unaffiliated



White mainline Protestants



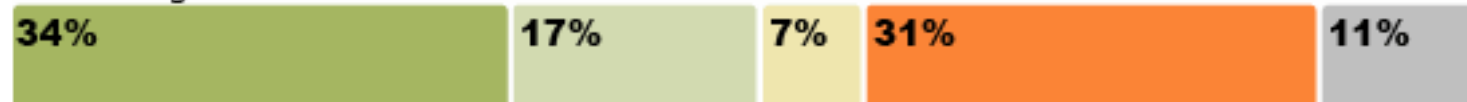
White non-Hispanic Catholics



Black Protestants



White evangelical Protestants

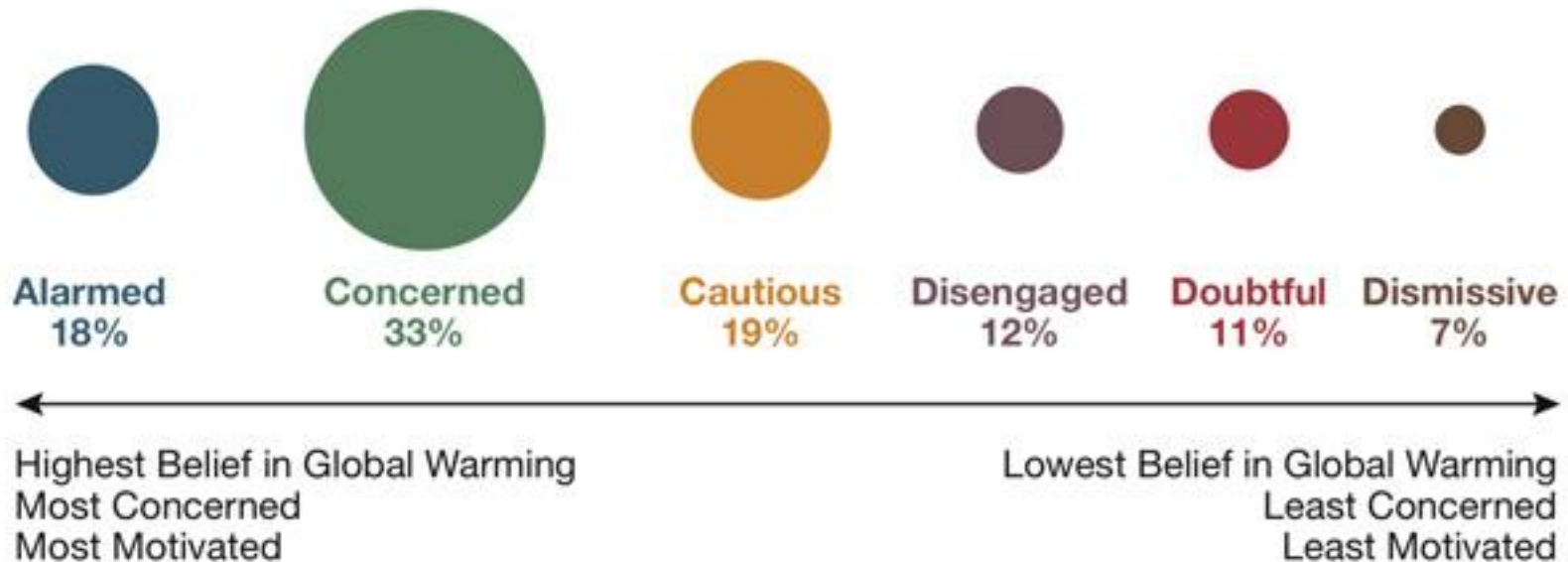


THE PEW FORUM ON RELIGION & PUBLIC LIFE
PEWFORUM.ORG

THE SIX AMERICAS SURVEY

Figure 1: Proportion of the U.S. Adult Population in the Six Americas

Proportion represented by area



traditional
religious views,
not certain global
warming is real

more conservative
religious views,
certain that global
warming is not real

WHY?



PART THREE

Why are science and faith in conflict?

Nearly all of us believe that ...

- God created the earth and it is good
- The earth sustains our physical existence
- Adam was given the responsibility to care for God's creation
- It is important to respect God's creation
- It is important to conserve our natural resources and budget wisely for the future

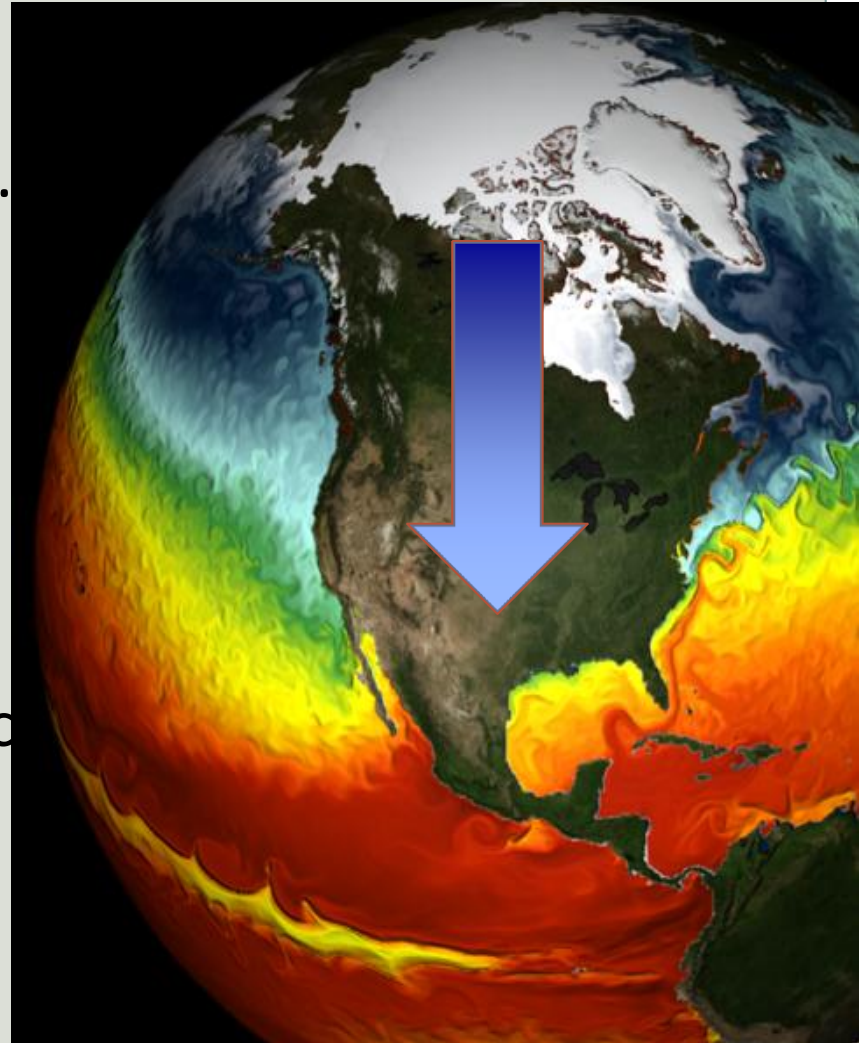
Why are science and faith in conflict?

The science is complex.

Many of the more obvious effects can't be seen in our own backyards.

What we do see in the backyard is often counter-intuitive:

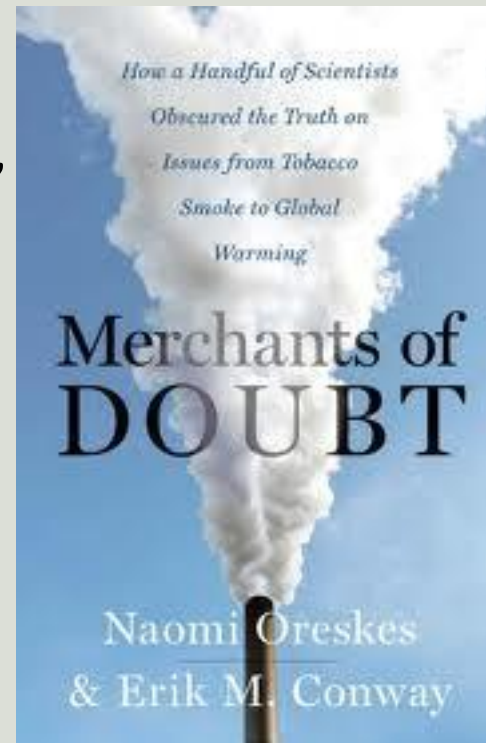
- Climate change can lead to stronger snow storms, as humidity increases
- Record warm winters in the Arctic can drive record cold across the Great Plains.



Why are science and faith in conflict?

There is a well-funded disinformation campaign at work, with the goals of:

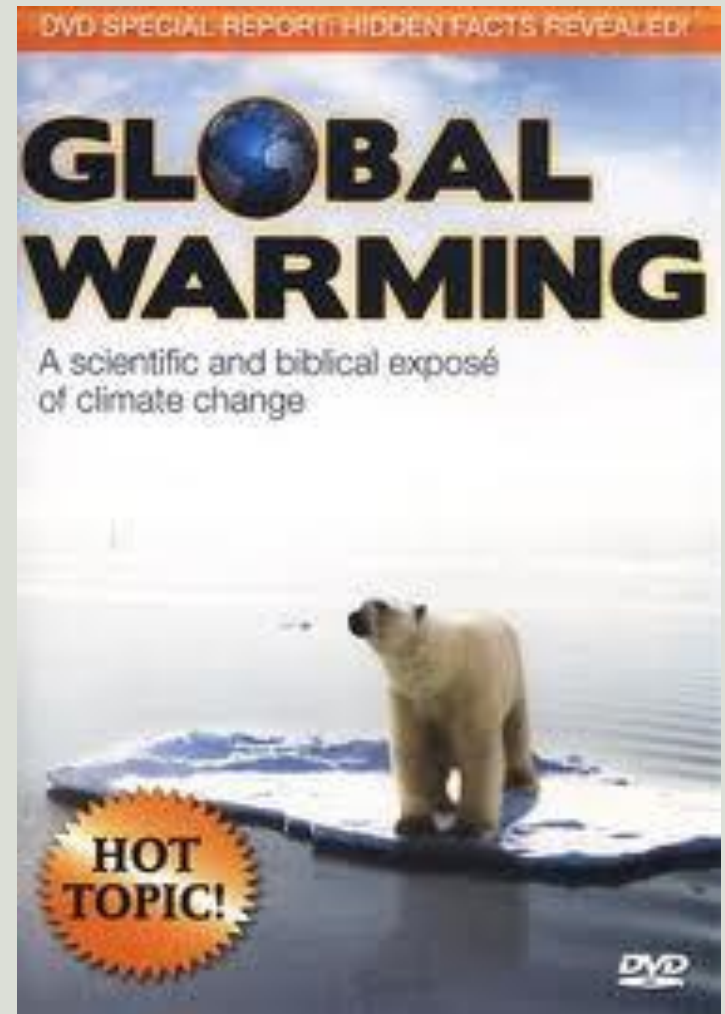
- muddying the science of climate change
- promoting the idea that the science is not settled
- actively opposing any legislation to limit emissions
- discrediting or discouraging scientists themselves



Why are science and faith in conflict?

Errors and lies are propagated by sources that Christians trust.

- 60% of pastors don't think this is a real issue
- 100% of GOP candidates also deny its reality
- conservative news pundits regularly ridicule climate science
- even some Christian groups actively participate in spreading false information



Why are science and faith in conflict?

Climate change is an daunting problem.

Even thinking about it can be overwhelming.

Doing something about it may limit or constrain goods and rights we hold dear.

Psychology tells us that it is often easier to deny the reality of a problem than to do something about it.



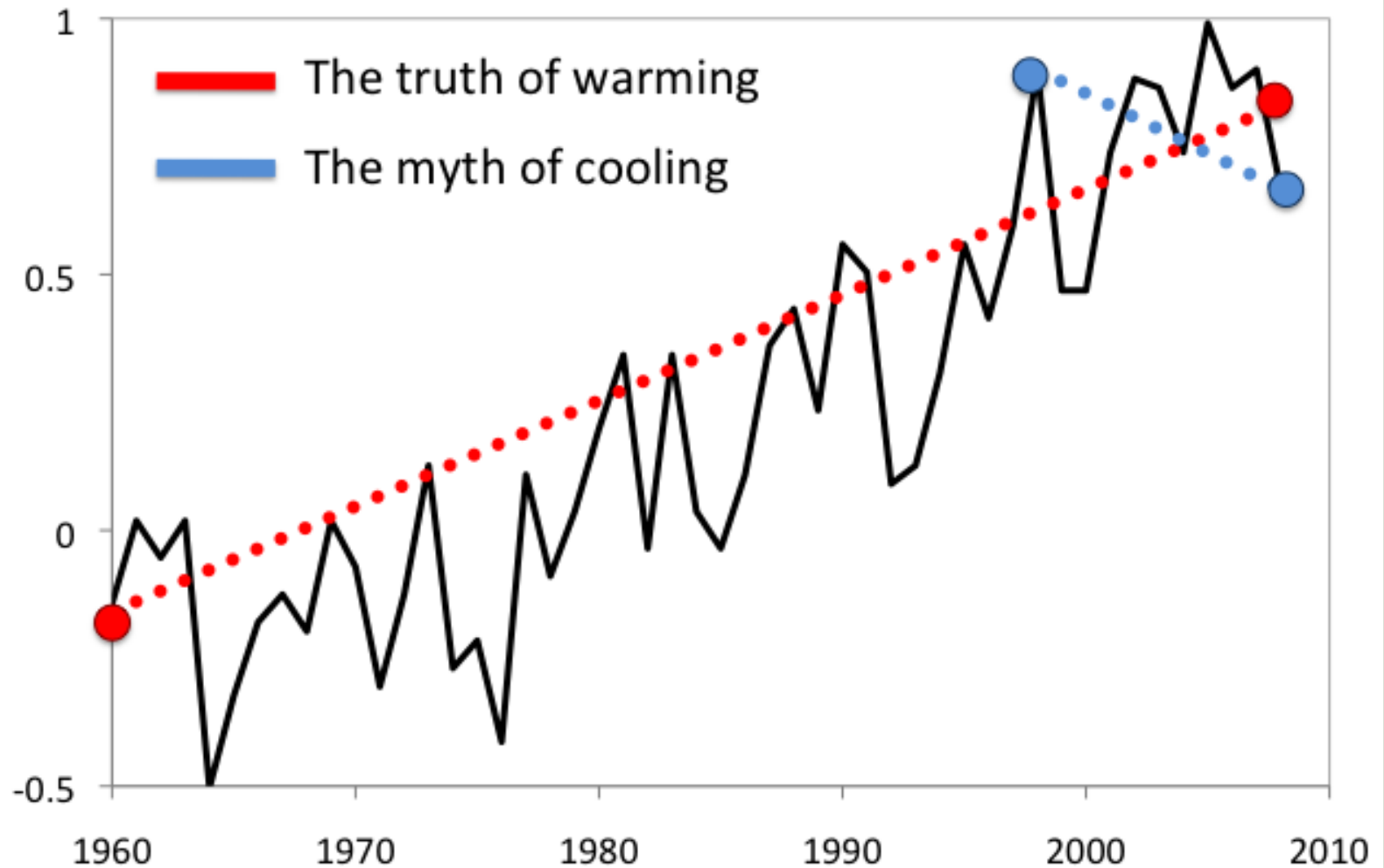
THE TRUTH ABOUT MYTHS



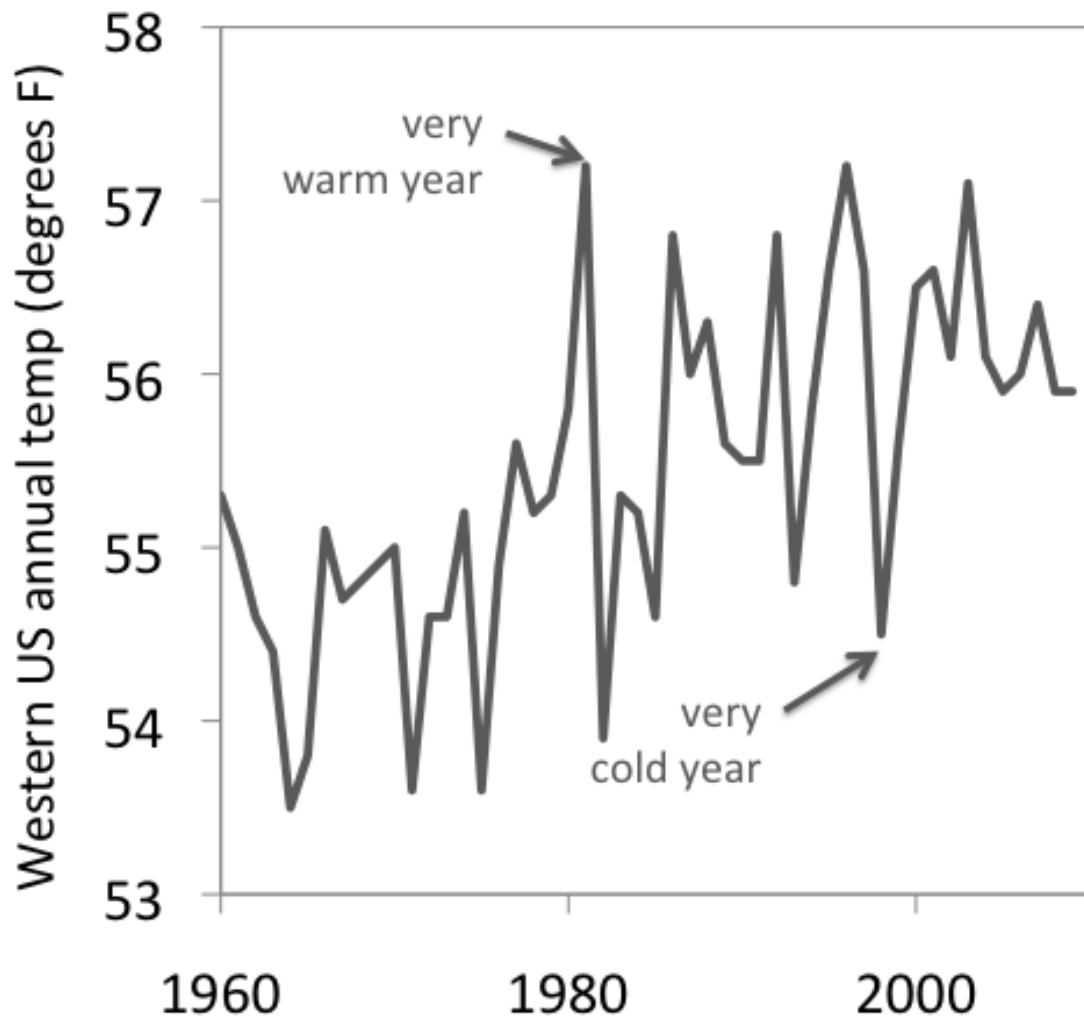
PART FOUR

It's cooling, not warming!

Temperature relative to 1961-1990 average (57.2°F)



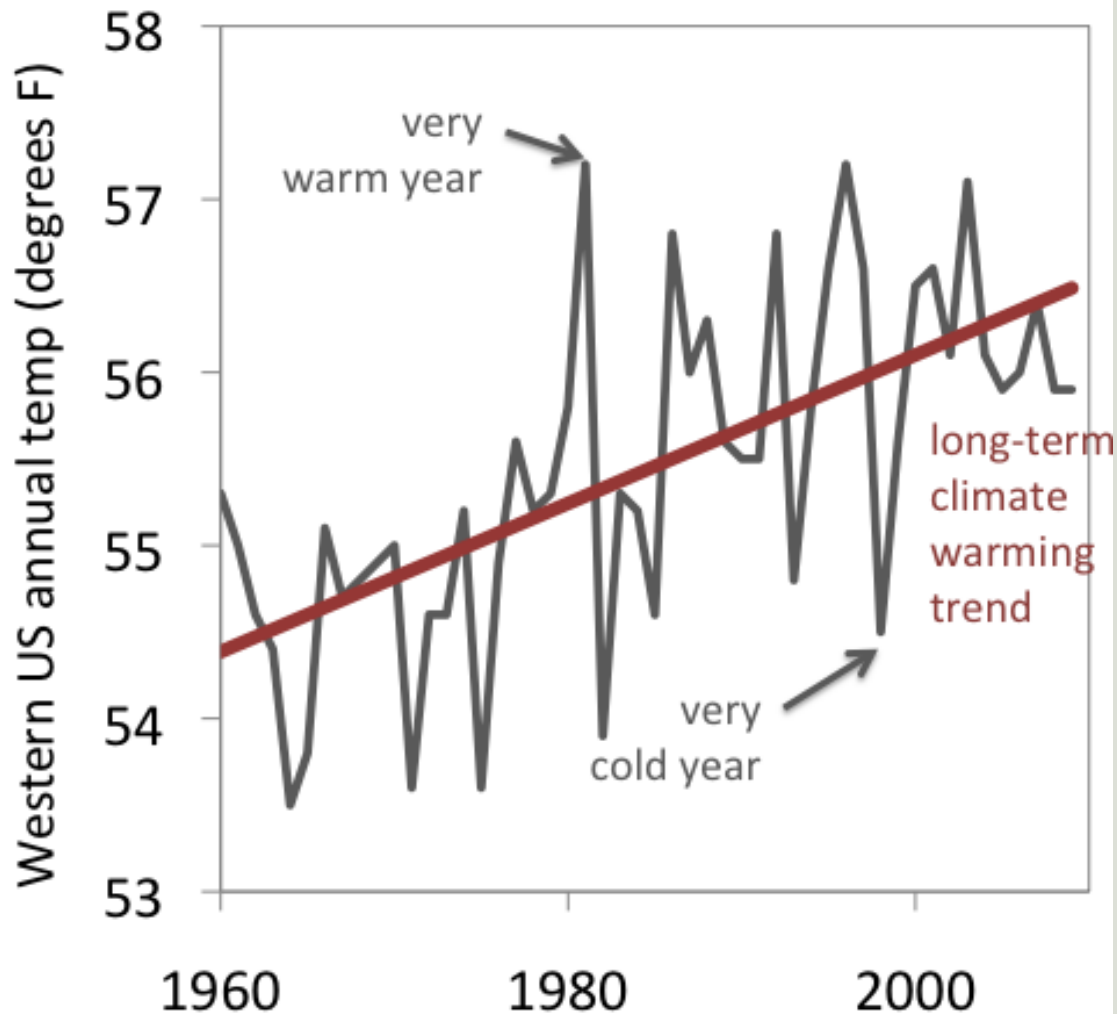
It's freezing outside—where's global warming?



WEATHER: How conditions change from day to day, or even year to year

-> unpredictable

It's freezing outside—where's global warming?



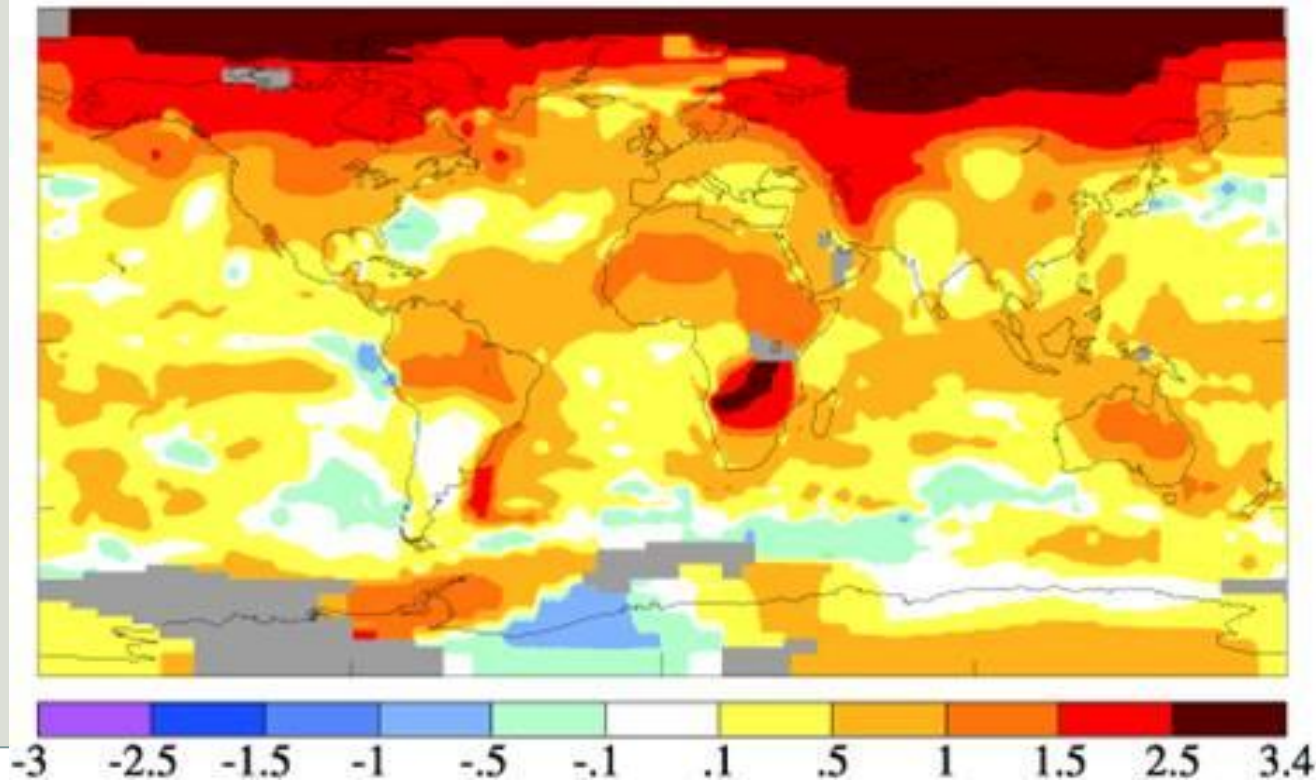
CLIMATE: The long-term average of weather over decades

-> quite predictable

Maybe it's just
the urban heat
island effect.

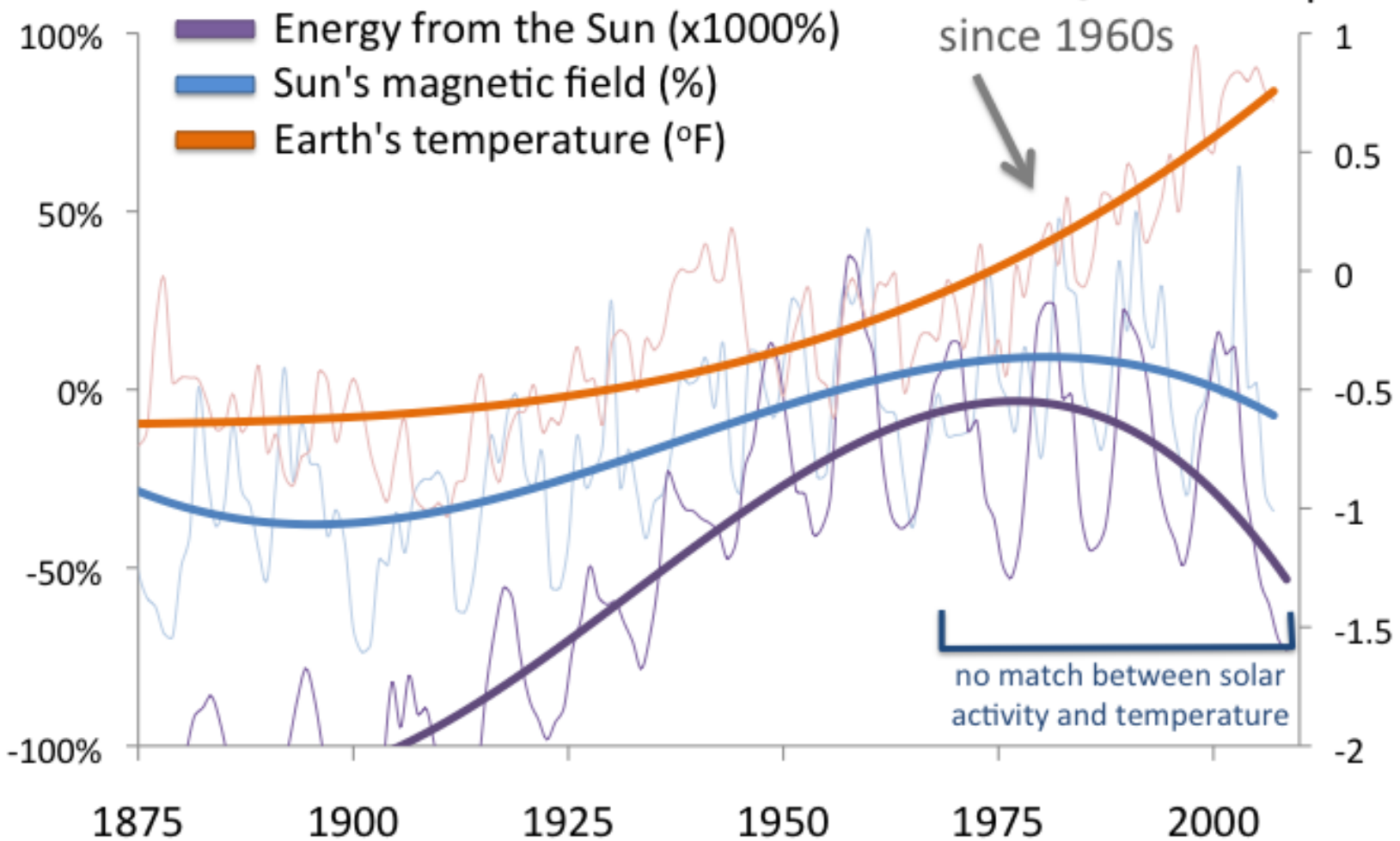
Where people
live →

Where it's
warming fastest
→



Could it be the sun?

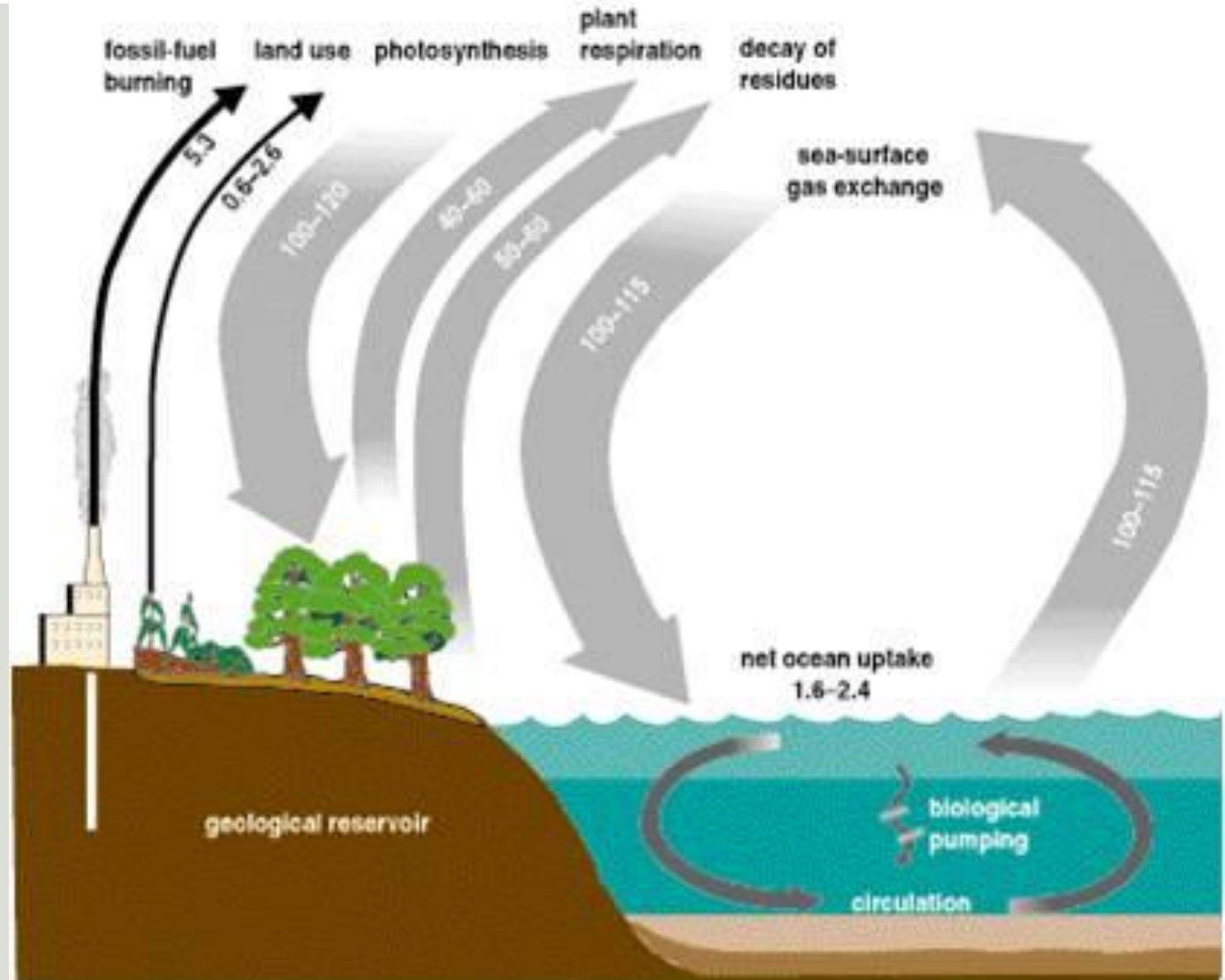
changes relative to 1961-1990 in:



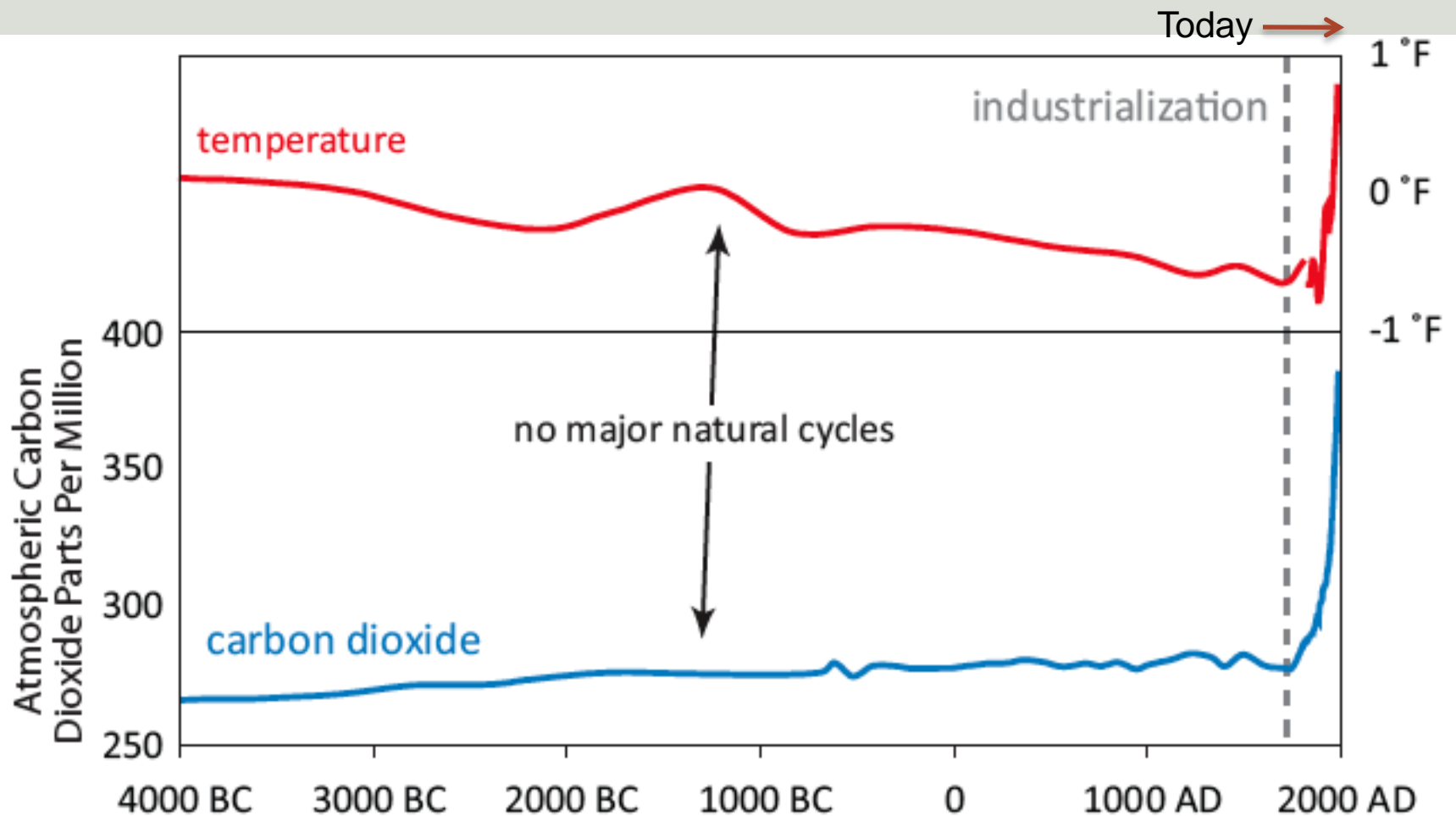
Aren't plants to blame, more than us?

Natural carbon sources take up as much or more than they produce.

Human carbon sources absorb *nothing*.



What about natural cycles?



It's such a small amount ...



There's a scientific consensus *against*

MYTH: 17,000 qualified individuals signed an Oregon petition claiming global warming had no scientific basis. In reality, petition asked whether climate change was “already causing catastrophic impacts.” *Scientific American* identified ~200 legitimate signees, only a handful of which were in relevant fields.

TRUTH: 98% of active scientists in related fields agree that climate change is occurring and is primarily the result of human emissions of heat-trapping gases.

Scientists are still arguing

Warming of the climate system is now evident from observations. Most of the increase is very likely (>90%) due to the observed increase in heat-trapping gas concentrations due to human activities [including burning fossil fuels].

Climatic change is being brought about by human-induced increases in the concentration of atmospheric carbon dioxide, primarily through the processes of combustion [burning] of fossil fuels.

Scientists are still arguing

Warming of the climate system is now evident from observations. Most of the increase is very likely (>90%) due to the observed increase in heat-trapping gas concentrations due to human activities [including burning fossil fuels].



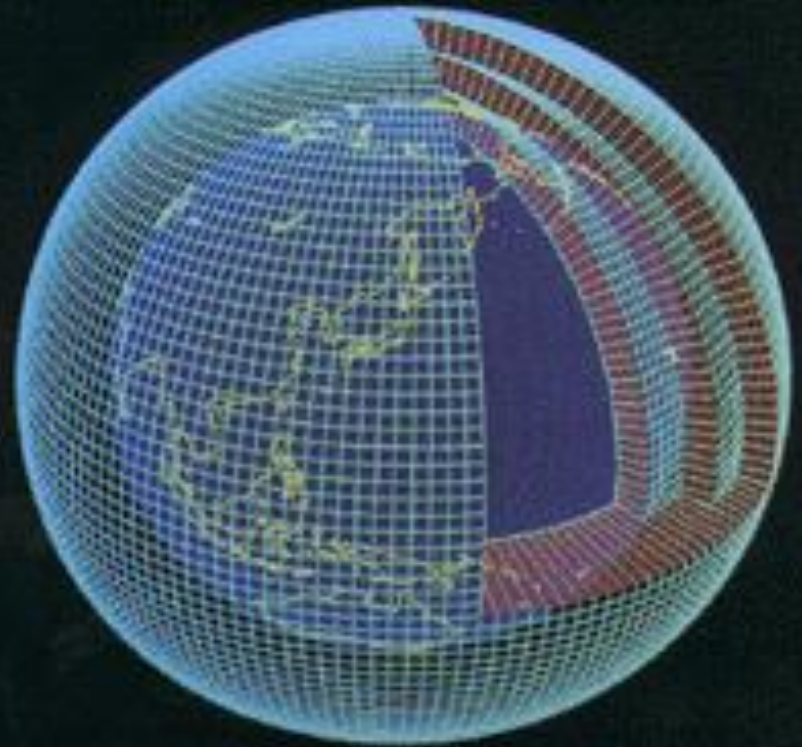
The United Nations Intergovernmental Panel on Climate Change, 2007

Climatic change is being brought about by human-induced increases in the concentration of atmospheric carbon dioxide, primarily through the processes of combustion [burning] of fossil fuels.

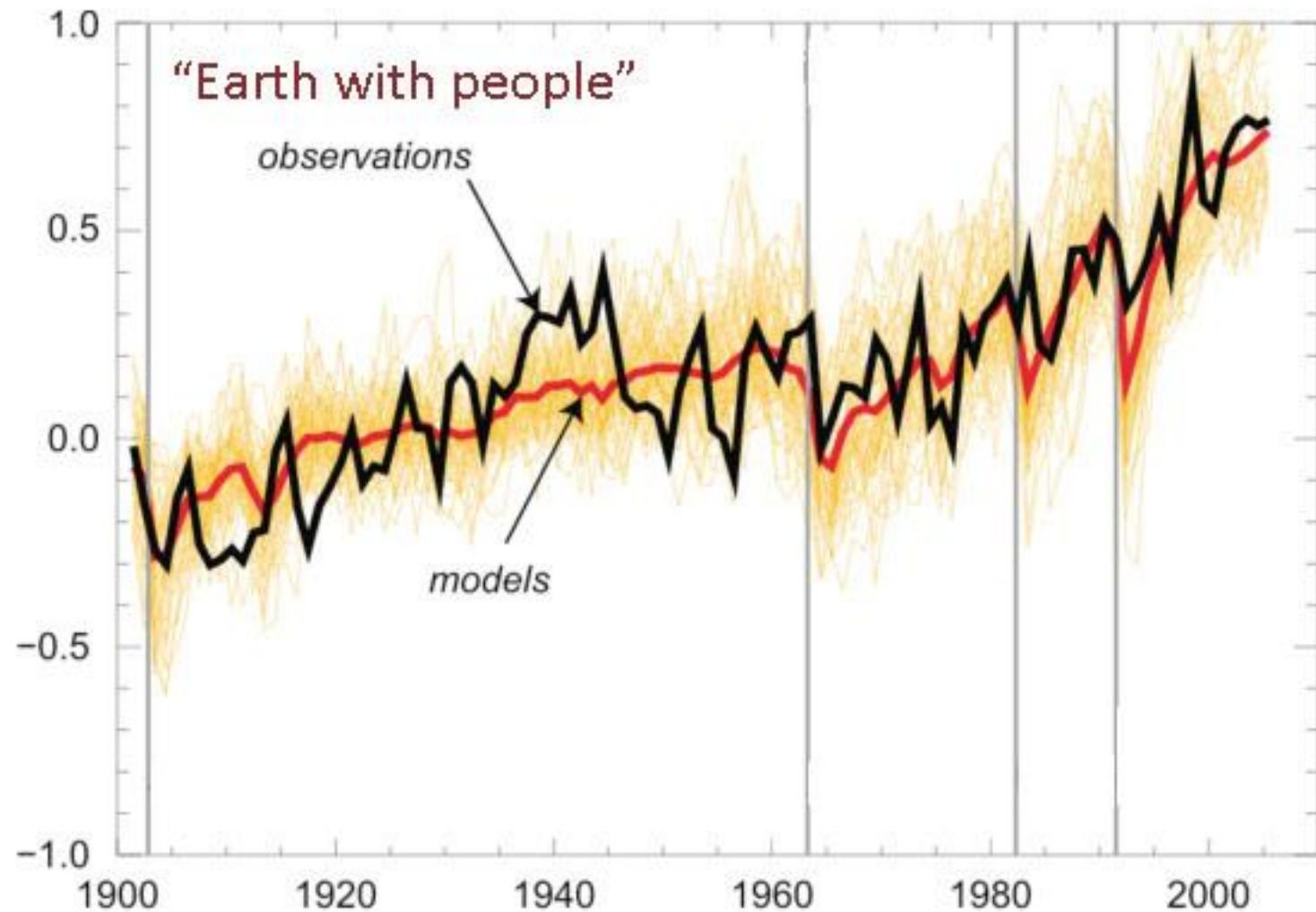
"The Artificial Production of Carbon Dioxide and Its Influence on Temperature"

Guy Callendar, 1938

How do we know it's us?



Quantifying the human influence



Why should I care?



PART FIVE

Why should I care? It just makes sense.

“Everything is permissible for me’—but not everything is beneficial”

1 Corinthians 6:12

“Do not be deceived, God is not mocked; for whatever a man sows, this he will also reap.”

Galatians 6:7

Why should we care? Jesus says...

“Love the Lord your God with all your heart and with all your soul and with all your mind.” This is the first and greatest commandment.

And the second is like it: “Love your neighbor as yourself.”

Matthew 22:37-39

Today, our neighbors are being harmed

Rising sea levels, widespread drought, and rapidly disappearing glaciers are already threatening millions with loss of water, food, and even life.

Today, our global neighbors—the poor and people currently strangers to us—are most vulnerable to harm from climate-related impacts.

- A Climate for Change

We have 3 choices:

“We basically have three choices: mitigation, adaptation, and suffering.

We’re going to do some of each. The question is what the mix is going to be.

The more mitigation we do, the less adaptation will be required and the less suffering there will be.”

John Holdren

President’s Science Advisor; Harvard University

How can we respond?

The only sensible response to climate change is to reduce our own contribution to the problem, minister to the hurting, and love our global neighbors as ourselves.

“The only thing that counts is faith expressing itself through love.”

Galatians 5:6

1. Educate ourselves and others



Arctic Methane on the Move?

Filed under: [Climate Science](#) — david @ 6 March 2010

Methane is like the radical wing of the carbon cycle, in today's atmosphere a stronger greenhouse gas per molecule than CO_2 , and an atmospheric concentration that can change more quickly than CO_2 can. There has been a lot of press coverage of a new paper in Science this week called "[Extensive methane venting to the atmosphere from sediments of the East Siberian Arctic Shelf](#)", which comes on the heels of a handful of interrelated methane papers in the last year or so. Is now the time to get frightened?

2. Prepare for what we can't avoid



Conserve the
resources we have

Protect ourselves from
what we can



3. Reduce our own impact



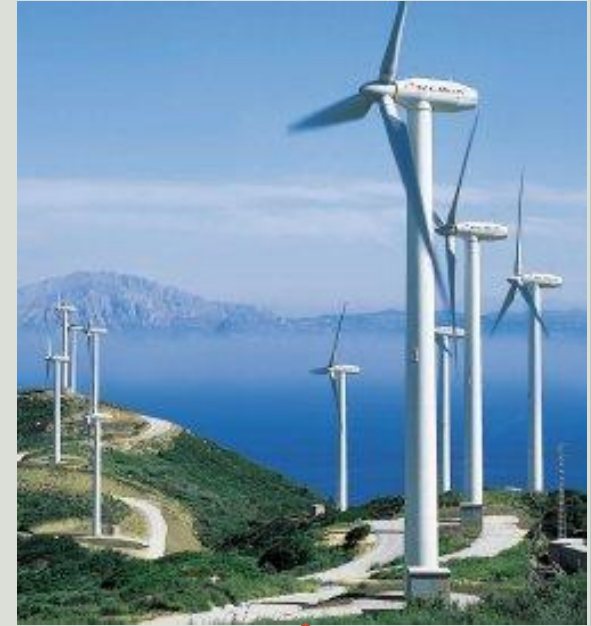
stop using this



start using this

Each US household replacing 1 light bulb
= taking 1,000,000 cars off the road (+\$30 savings per bulb)

4. Support fundamental change



stop using this

start using this

Renewable energy gives us clean air and water, and home-grown energy sources that will never run out. So, why not?



CHANGE IS
POSSIBLE

CHANGE IS
ALREADY
HAPPENING

THE END

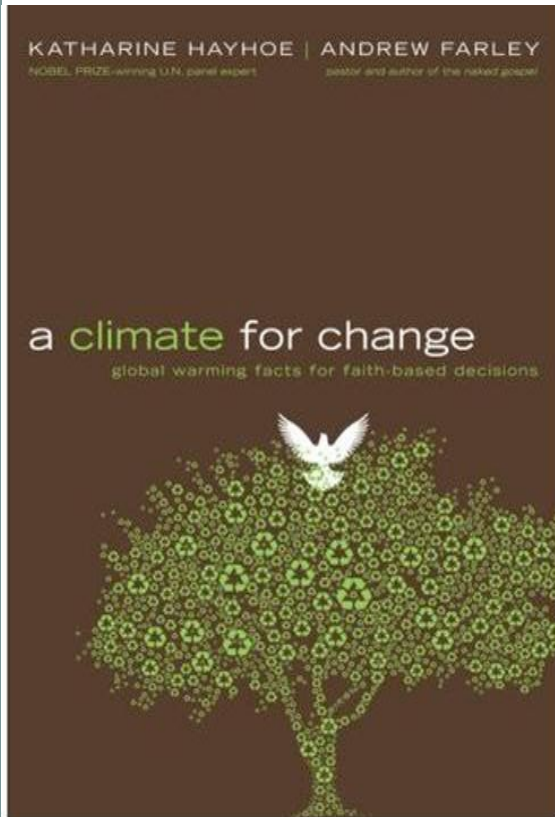


FOR MORE INFORMATION

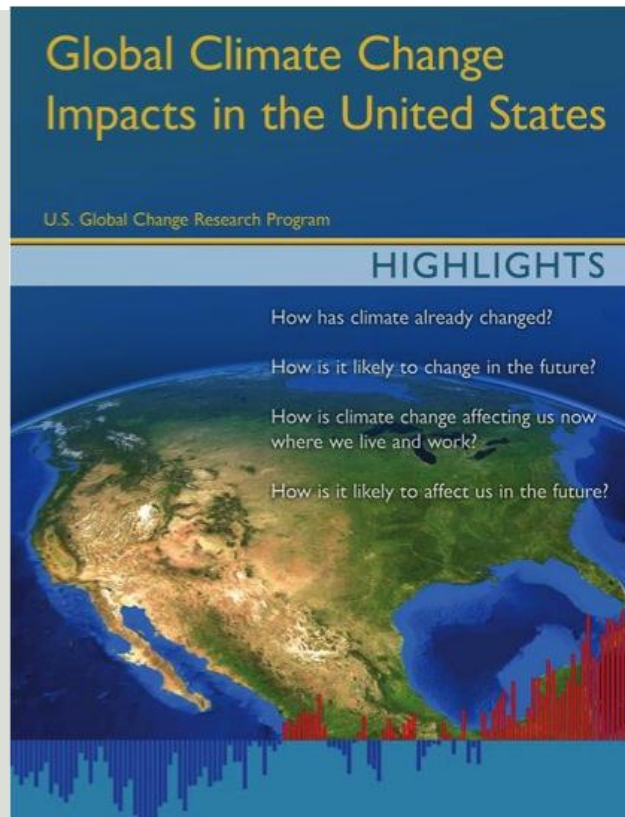
WWW.KATHARINEHAYHOE.COM

WWW.NOTBLUENOTRED.COM

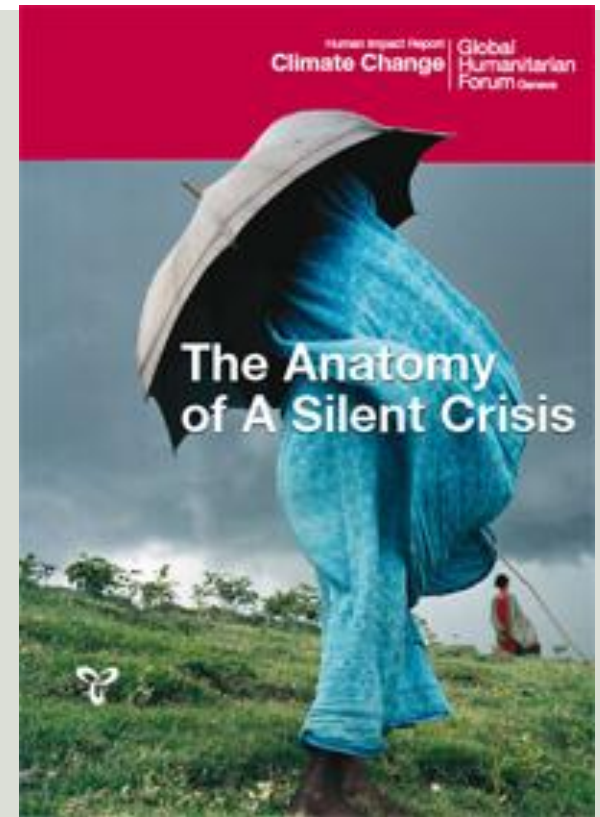
Other Resources



How we know it's happening and why it matters
climateforchangethebook.com



How climate change affects us here in the US
US Global Change Program
www.globalchange.gov/usimpacts



How climate change affects our global neighbors
Global Humanitarian Forum
www.ghf-geneva.org