Climate Change Assembly

Presented by

Lyndon State College Climate Change Committee

LYNDON
A vermont STATE COLLEGE

ace
ALLIANCE FOR CLIMATE EDUCATION
EDUCATE. INSPIRE. ACTIVATE.

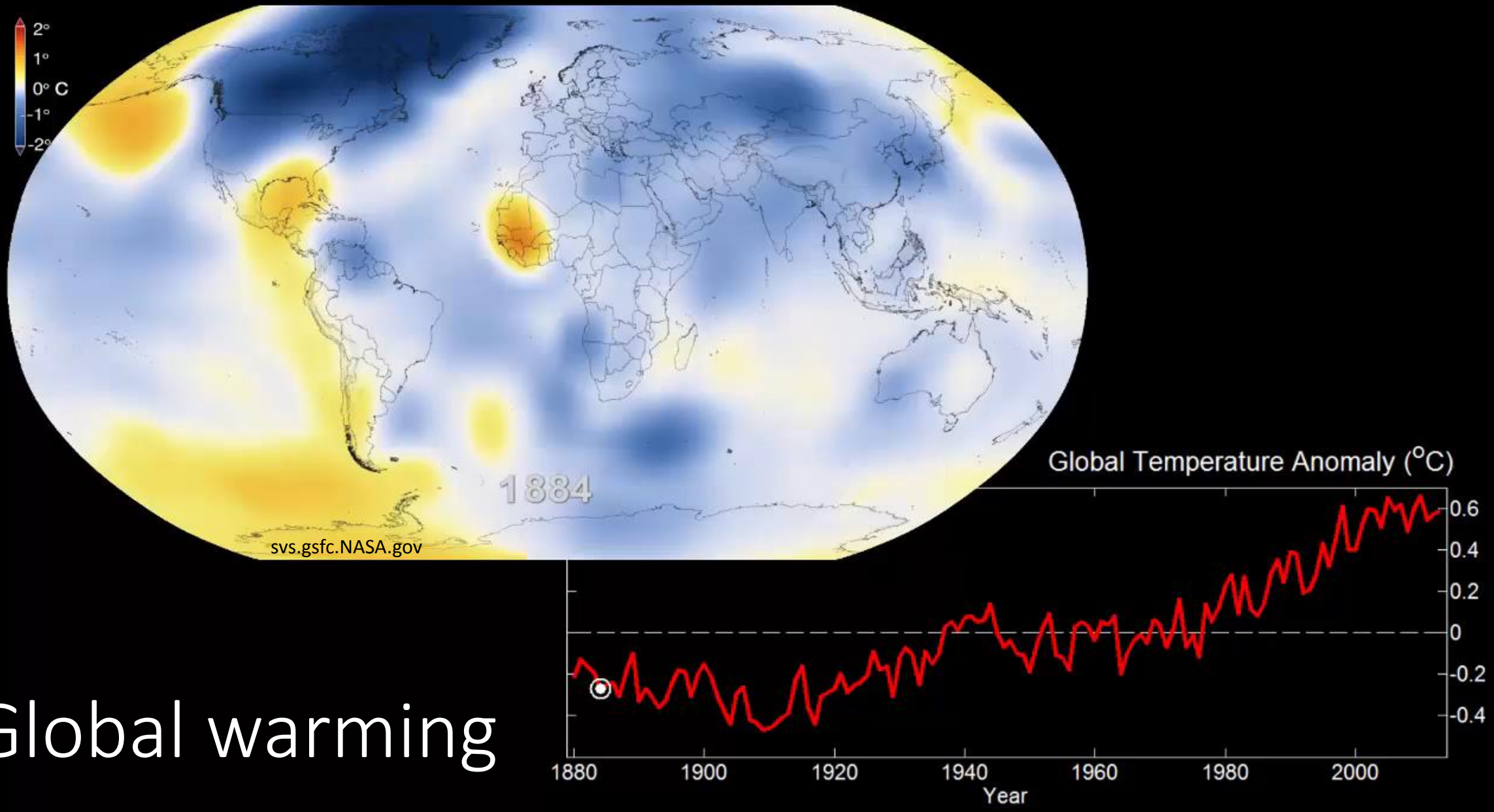
Atmospheric Science

Weather

- Atmospheric state at a given time
- Individual events
- Short-term forecasts (1 – 5 days)

Climate

- Long-term behavior of weather
- Groups of events
- Long-term forecasts (1 – 100+ years)

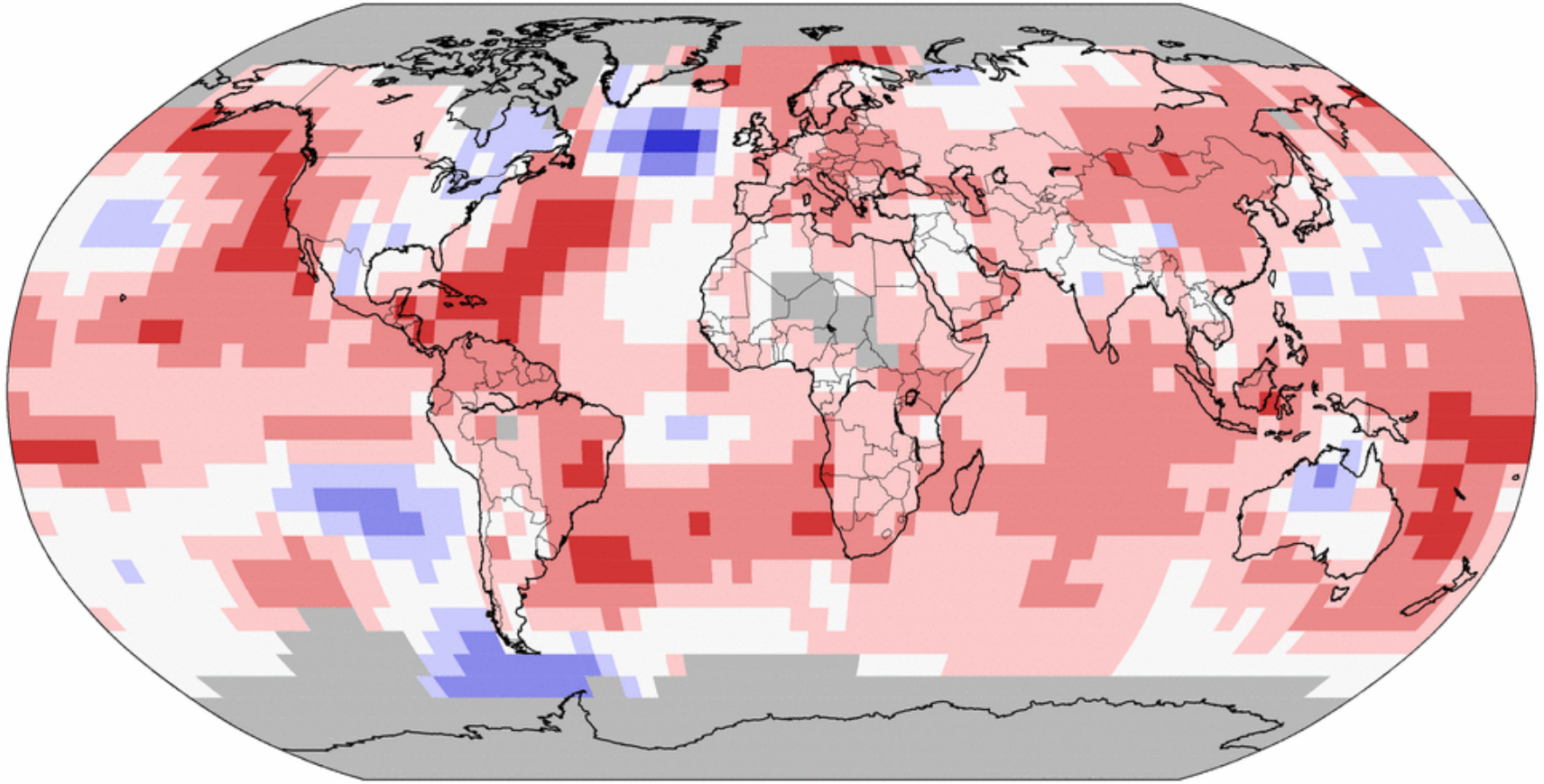


Global warming

Land & Ocean Temperature Percentiles Jan 2015

NOAA's National Climatic Data Center

Data Source: GHCN–M version 3.2.2 & ERSST version 3b



Record Coldest | Much Cooler than Average | Cooler than Average | Near Average | Warmer than Average | Much Warmer than Average | Record Warmest

Tue Feb 17 19:11:50 EST 2015

Global warming

- Increasing *<u>global</u>* temperatures over *<u>many years</u>*

Climate change

- Temperature
- Precipitation
- Cloud cover
- Wind speed/direction

- Weather systems
- Ocean
- Sea ice

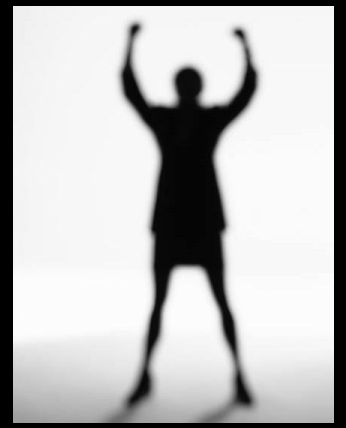
What changes global temperatures?

Natural

- Changes in Earth's orbit
- Carbon uptake and release by vegetation
- Ocean currents
- Solar cycles
- Volcanic activity

Anthropogenic

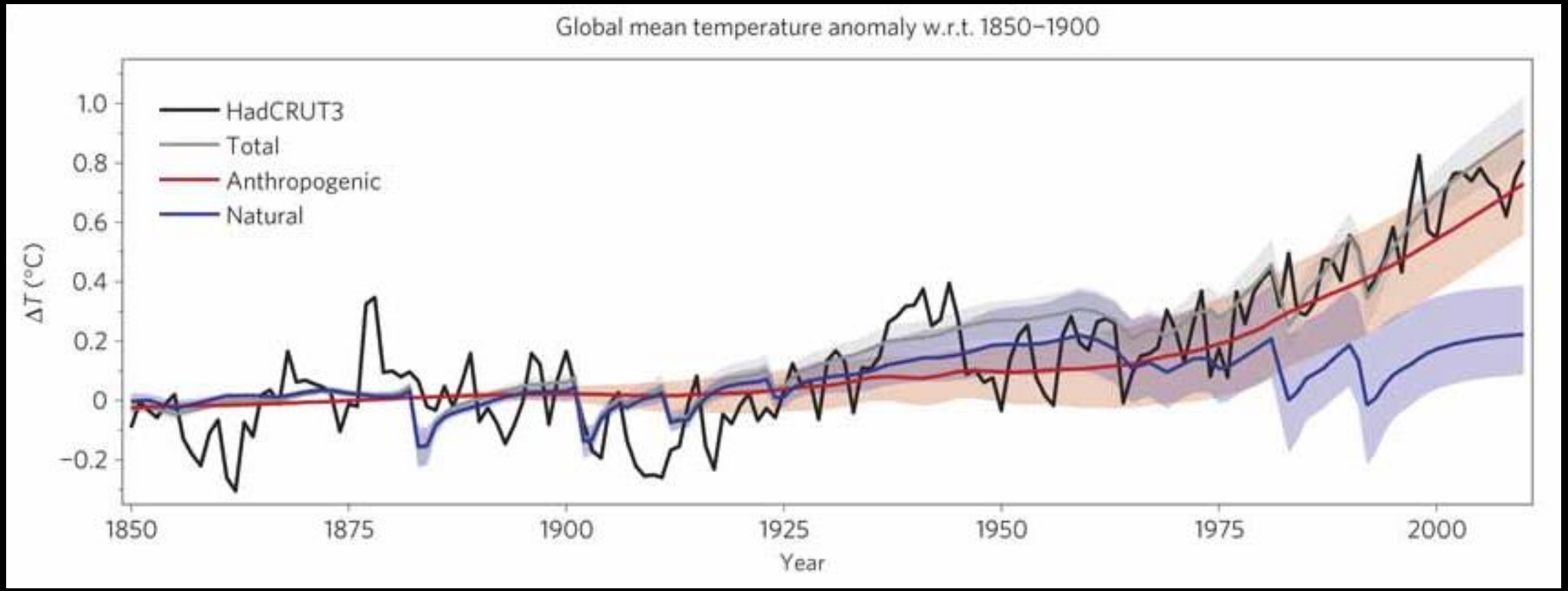
- Aerosol emissions
- Greenhouse gas emissions



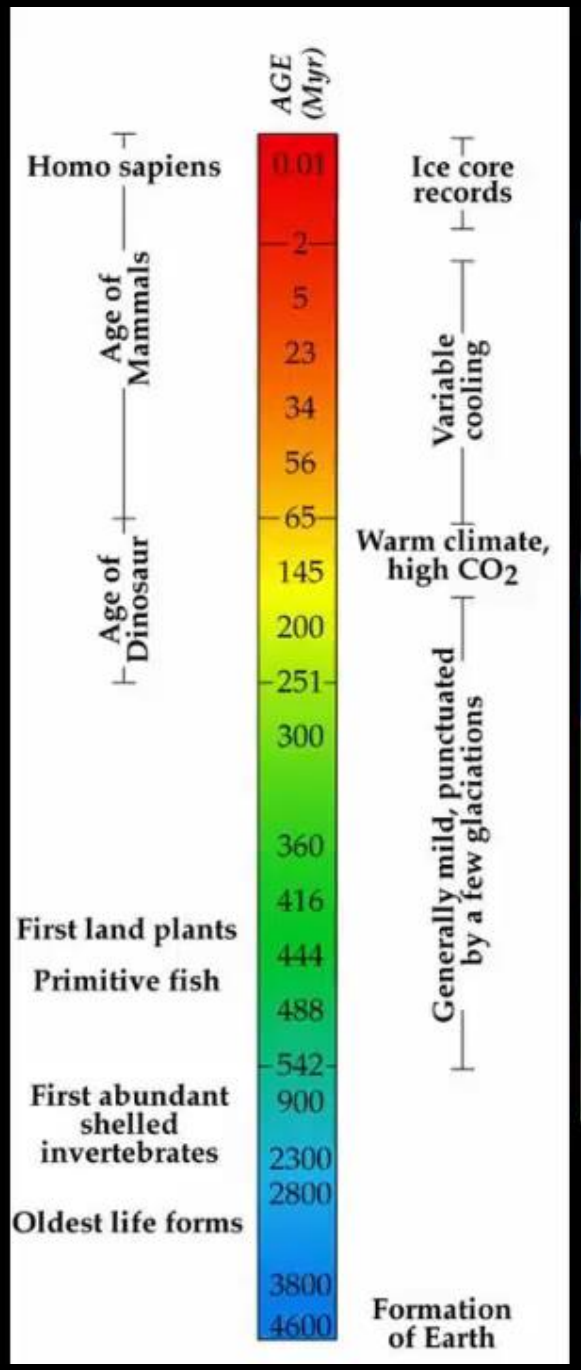
Surface Temperature Change and Sun's Energy

http://www.climatecommunication.org/

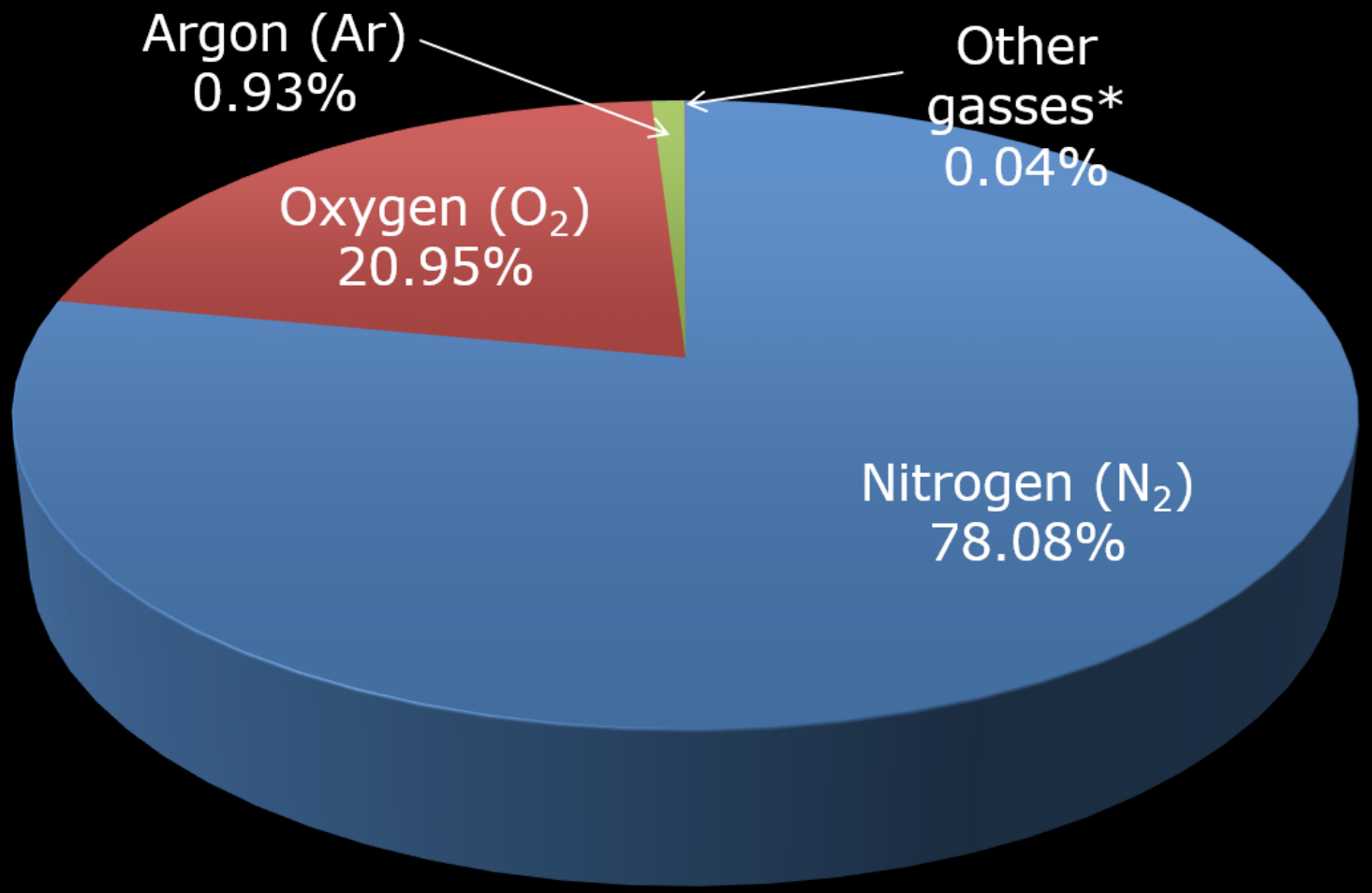
CLIMATE COMMUNICATION | Making Science Heard & Understood



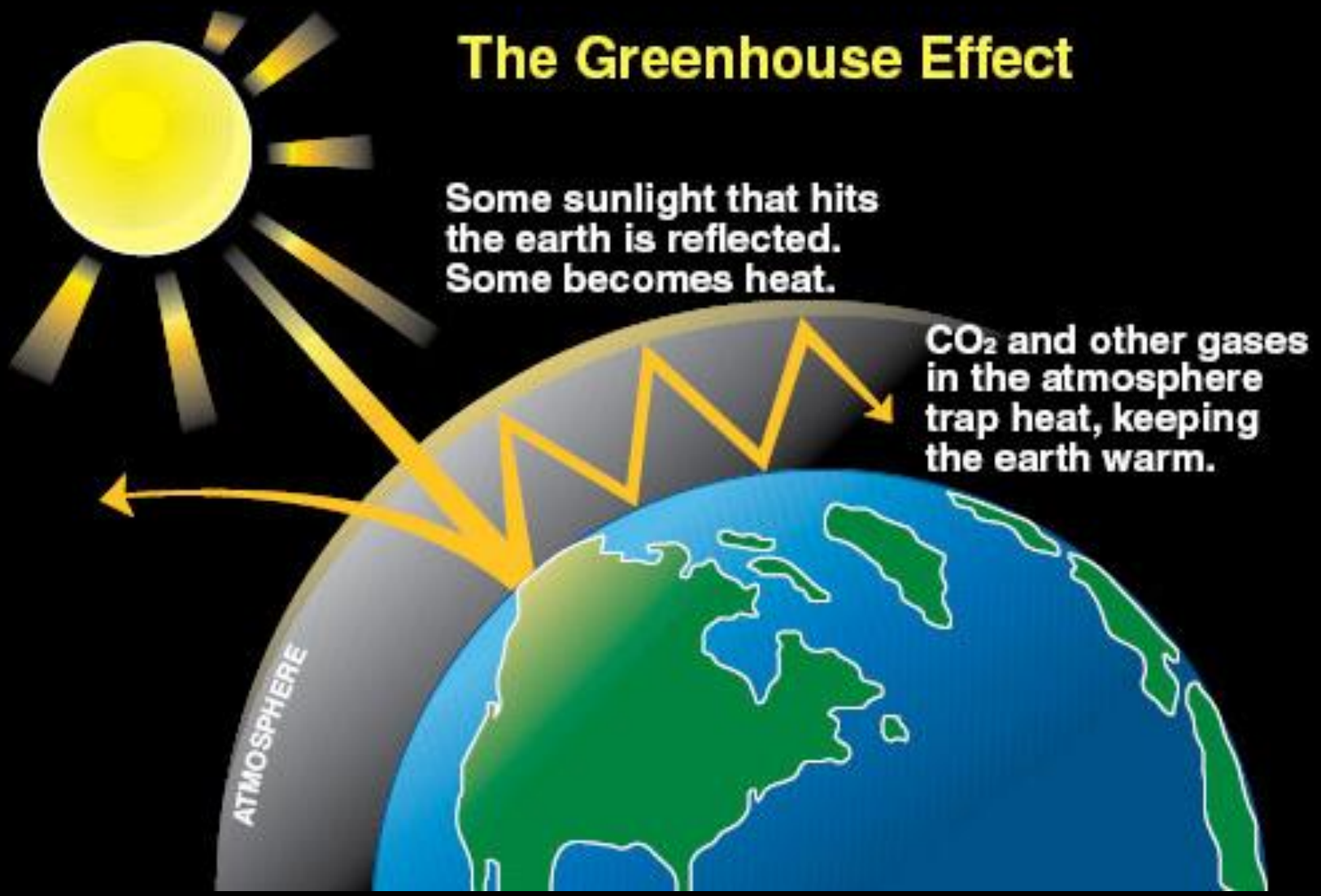
Huber and Knutti (2012), Anthropogenic and natural warming inferred from changes in Earth's energy balance, *Nature Geoscience*



Atmospheric composition



*including water vapor, carbon dioxide, neon, helium, methane, krypton, hydrogen, nitrous oxide, carbon monoxide, xenon, ozone, nitrogen dioxide, iodine, and ammonia



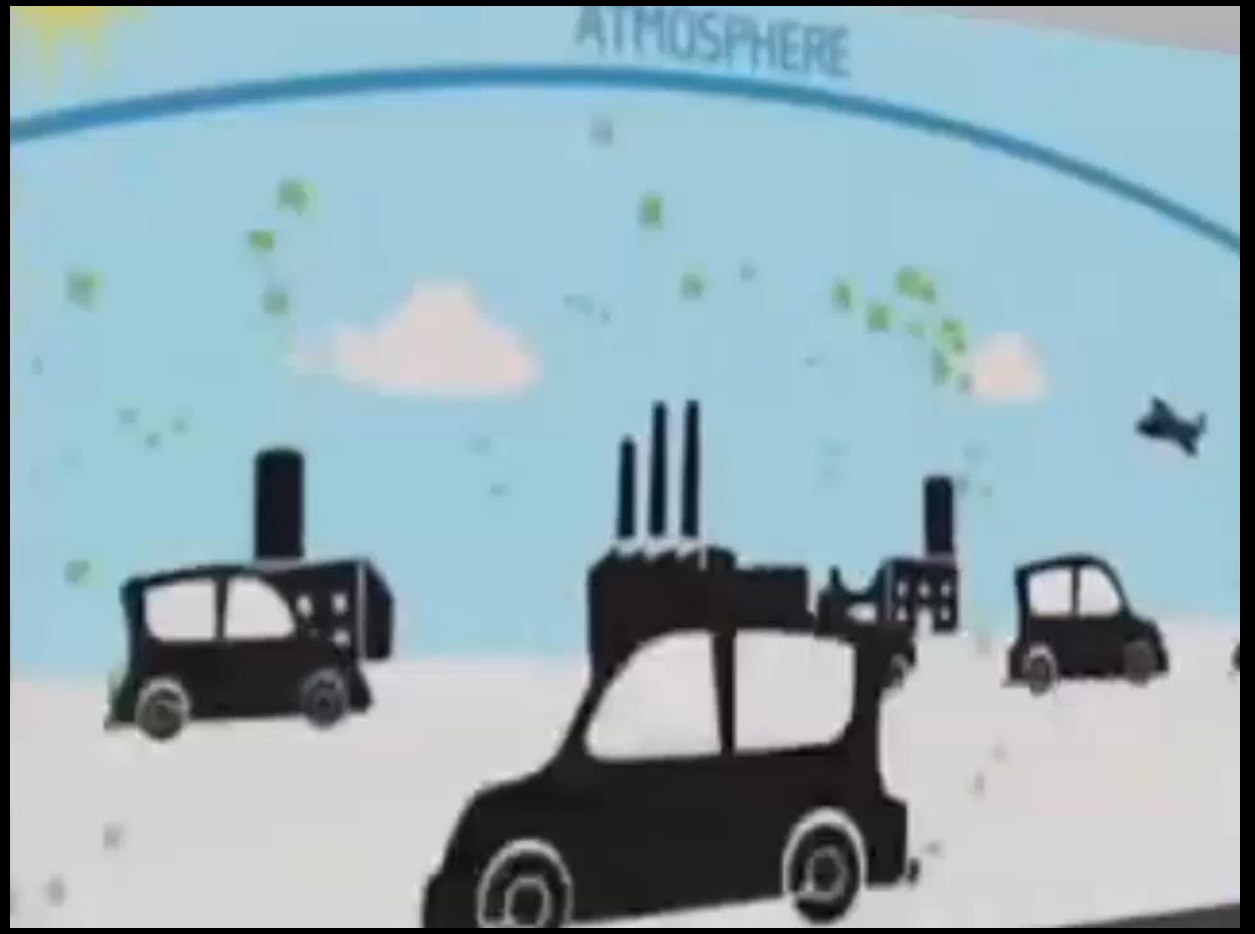
http://www.ecy.wa.gov

What is the Greenhouse Effect?

Ideasforacoolerworld.org

Parts per million (PPM):

$$\frac{\text{Amount of } CO_2}{\text{Amount of other gasses}} \times 1{,}000{,}000$$



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Atmospheric CO2 Concentrations
1960 - 2010

http://www.climatecommunication.org/

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CO2 Was Way Higher in the Past


440
420
400
380
360
340
320
300
280
260
240
220
200
180
160
CO_2 parts per million
* current CO_2 level
For 650,000 years, atmospheric CO_2 has never been above this line ... until now
1950
400,000
350,000
300,000
250,000
200,000
150,000
100,000
50,000
0
YEARS before today (0 = 1950)
NASA
GLOBAL CLIMATE CHANGE
climate.nasa.gov

American Association for the Advancement of Science (AAAS)

"…global climate change caused by human activities is occurring now, and it is a growing threat to society."

American Meteorological Society (AMS)

"There is unequivocal evidence that Earth's lower atmosphere, ocean, and land surface are warming.... The dominant cause of the warming since the 1950s is human activities."

American Geophysical Union (AGU)

"The Earth's climate is now clearly out of balance and is warming.... The scientific evidence for human activity impacting climate is strong and widely accepted within the scientific community."

Intergovernmental Panel on Climate Change (IPCC)

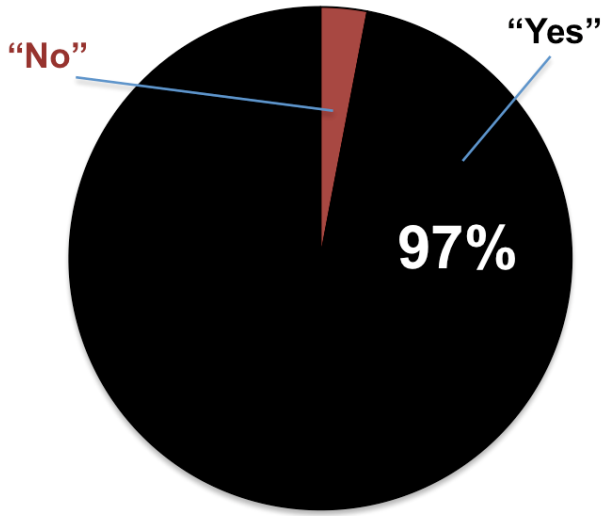
"Scientific evidence for warming of the climate system is unequivocal. ... Human activities have changed and continue to change the Earth's surface and atmospheric composition… and are thus drivers of climate change."

The Geological Society of America

"…global climate has warmed and human activities (mainly greenhouse-gas emissions) account for most of the warming since the middle 1900s."

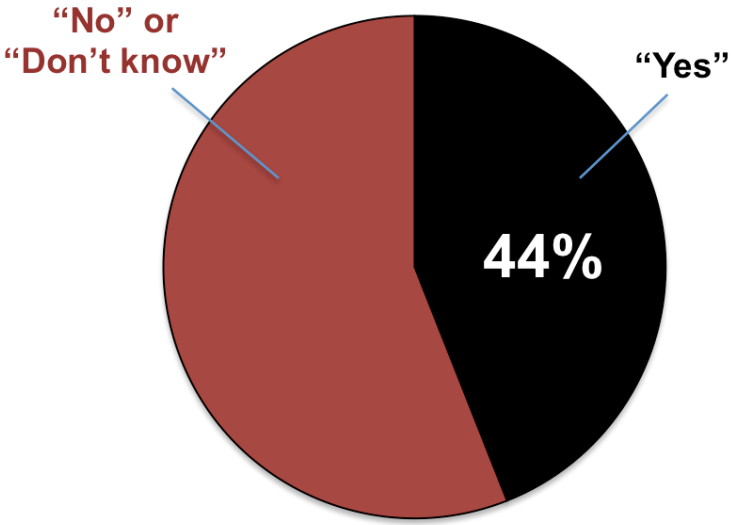
Is Global Warming Happening and Mostly Human Caused?

Climate Scientists[1] say…



[1]Proportion of peer-reviewed papers that stated a position on the reality of human-caused global warming and said it is happening and human caused (Cook et. al, 2013).

The American Public[2] says…



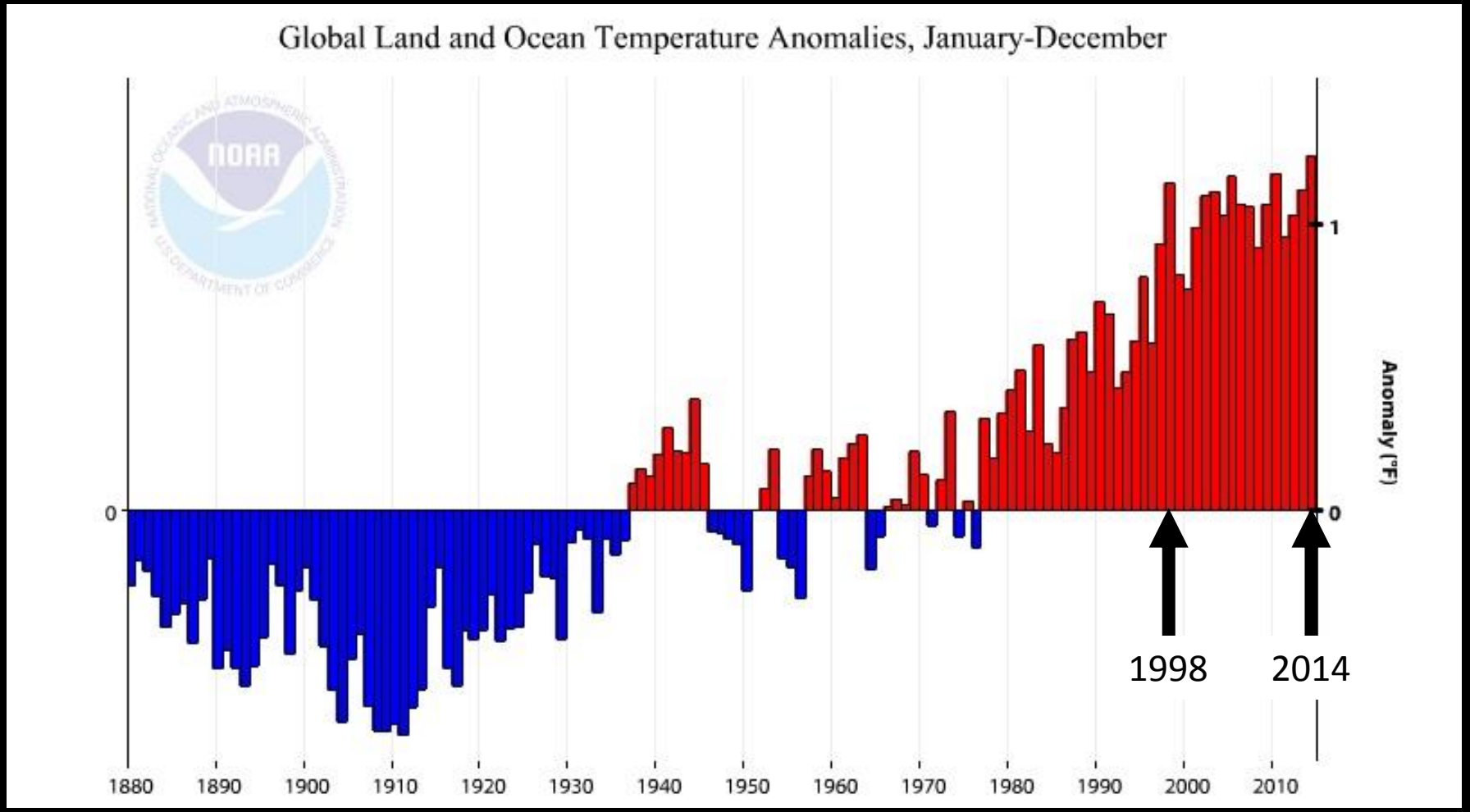
[2]Question asked of Americans (18+): Assuming global warming is happening, do you think it is caused mostly by human activities; caused mostly by natural changes in the environment; other; none of the above because global warming isn't happening."

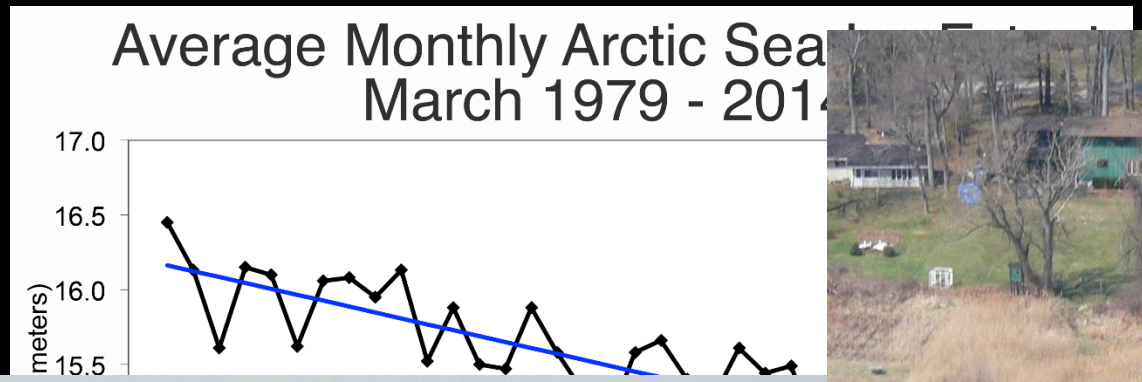
Base: Americans 18+ (n=1,013). April, 2014.

YALE PROJECT ON CLIMATE CHANGE COMMUNICATION
BRIDGING SCIENCE + SOCIETY

4C

George Mason University
Center for Climate Change Communication


Global Land and Ocean Temperature Anomalies, January-December
NOAA
1
0
0
Anomaly (°F)
1998
2014
1880
1890
1900
1910
1920
1930
1940
1950
1960
1970
1980
1990
2000
2010



Lake Michigan (courtesy of Dave Mickelson)

Hurricane Sandy (theatlantic.com)

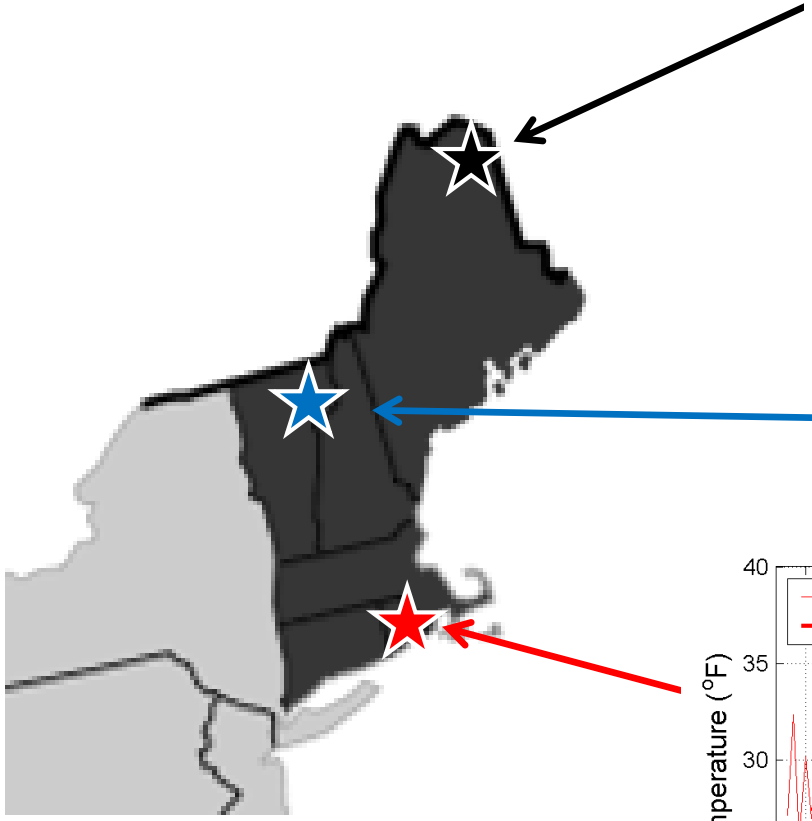
Earthobservatory.NASA.gov

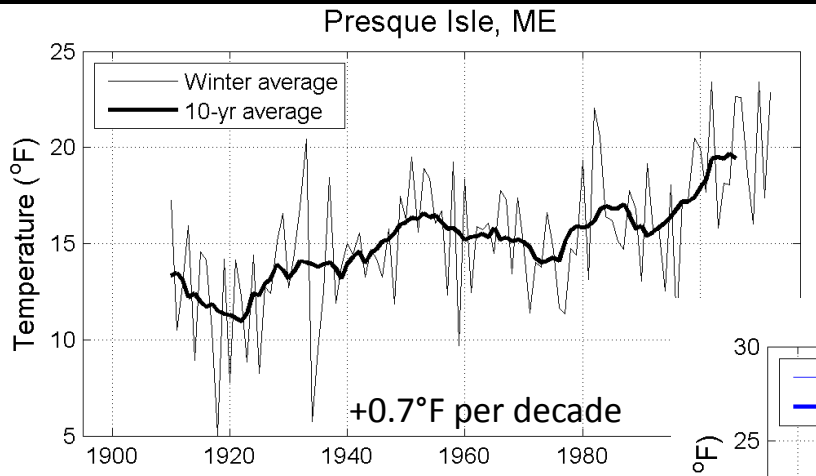
Climate changes in New England

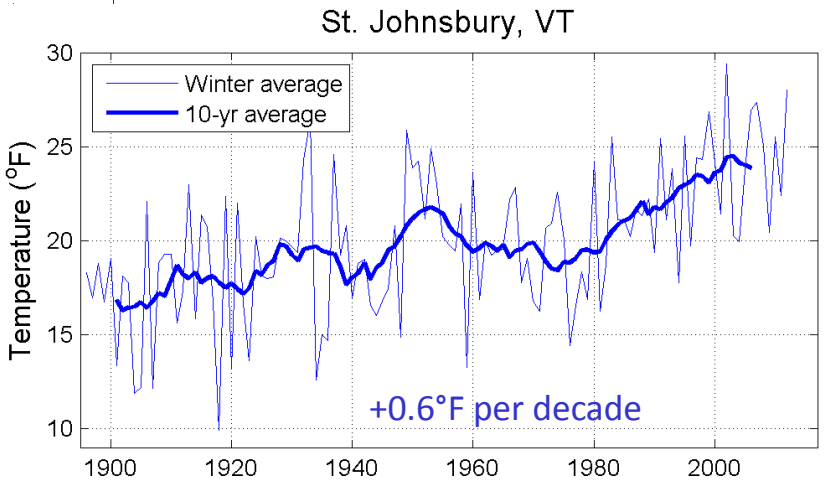
- More days with temperatures above 90°F
- Flooding due to increased heavy precipitation
- Greater frequency of drought events
- Shorter and warmer winters
- Less snow, more rain/freezing rain
- More energy outages due to severe weather events
- Migration of invasive species
- Increasing transmission of infectious diseases
- Worsening of air quality
- Shorter sugaring season
- Increasing sea levels

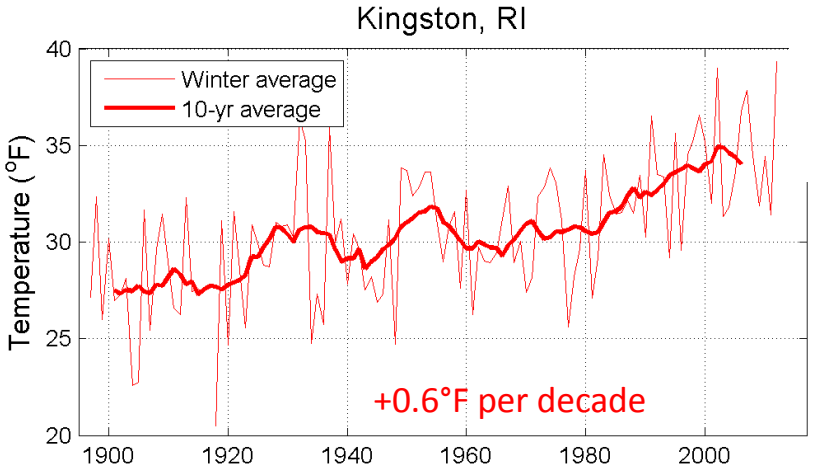
Climate changes in New England

Wintertime temperatures









(Global annual average: +0.13°F per decade)

A Range of Possible Futures

http://www.climatecommunication.org/

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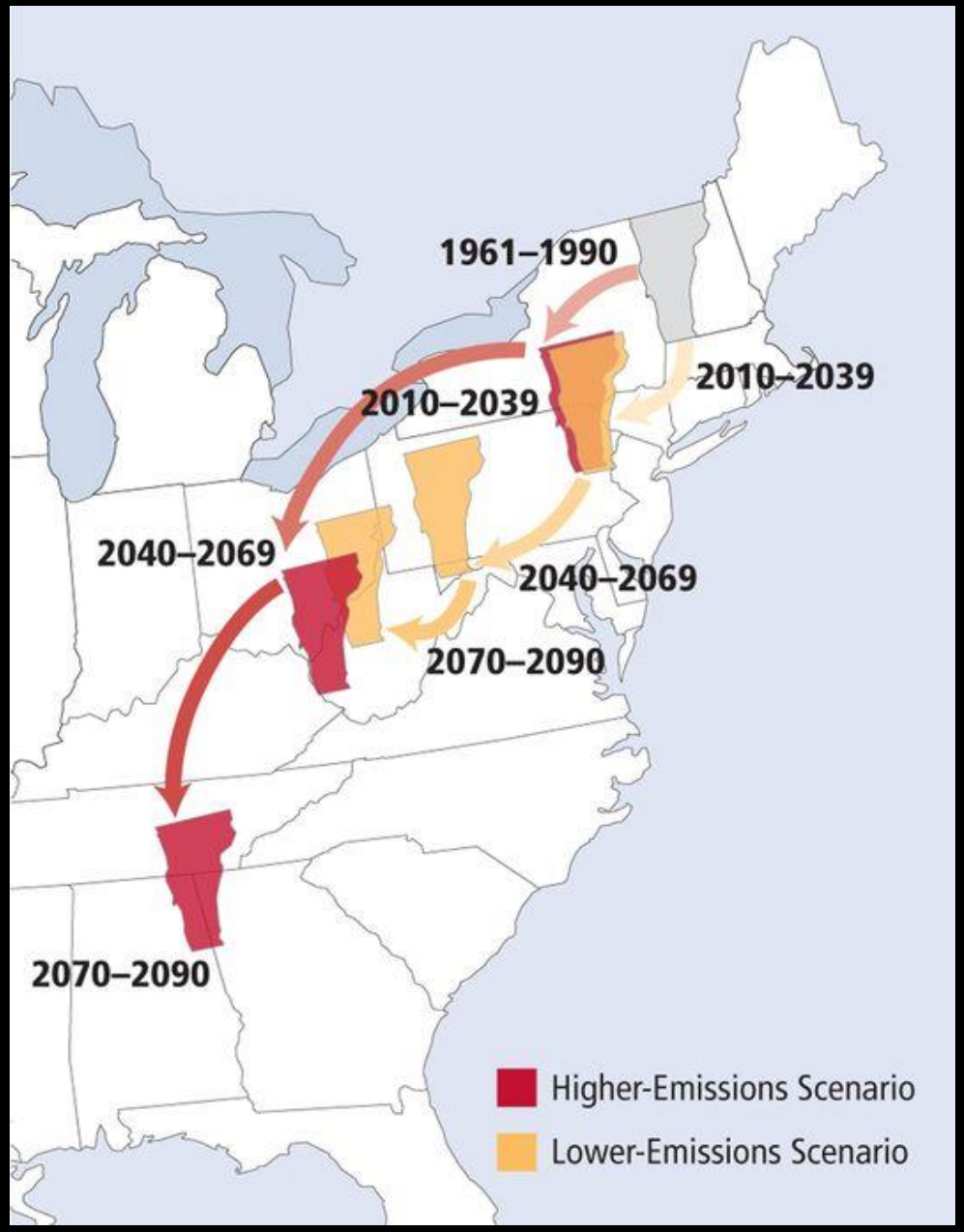
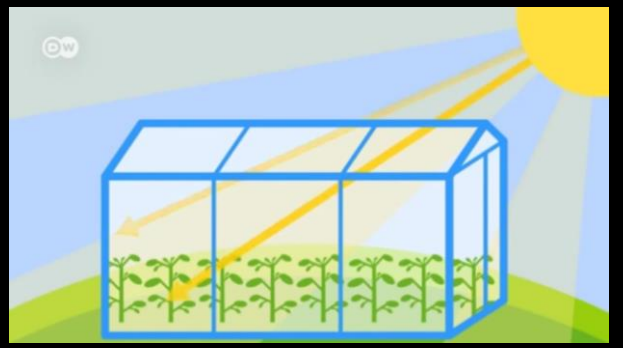
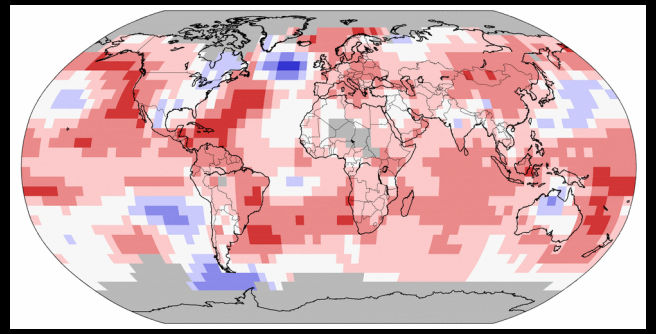


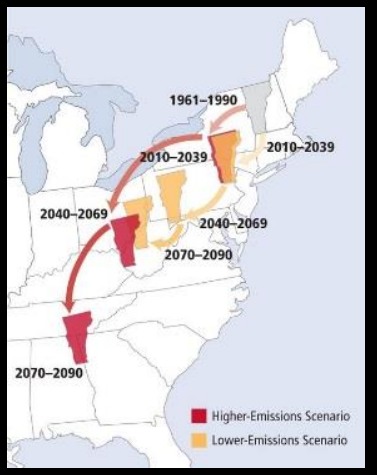
Union of Concerned Scientists
Science for a healthy planet and safer world

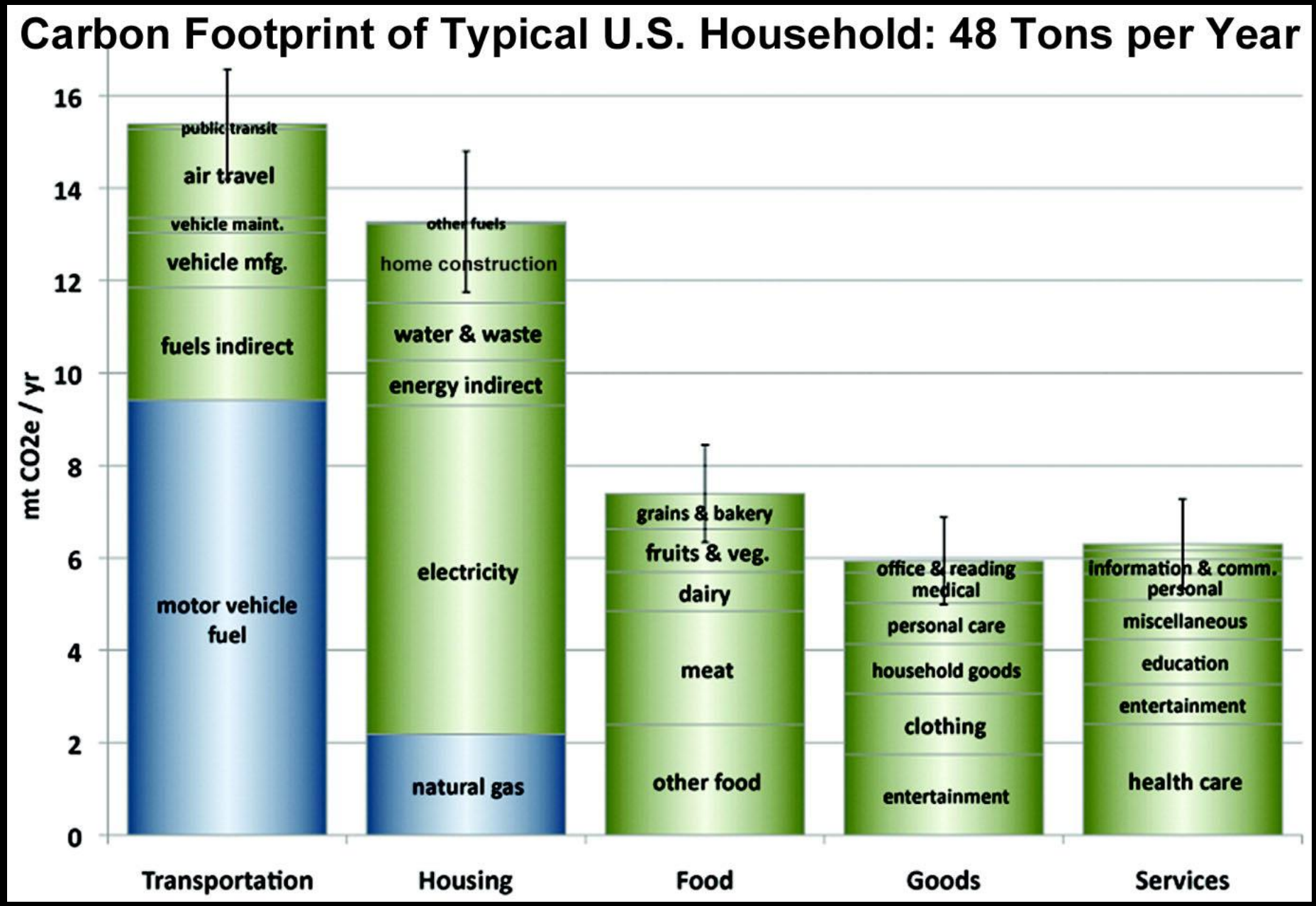
Let's review!

- Fossil fuels were trapped underground for millions of years
- CO_2 and other greenhouse gasses are now being emitted into our atmosphere
- Result? Our planet is warming and the climate is changing (and scientists agree!)
- Climate will change more drastically in some locations
- Global warming will only get worse unless we do something... Now!



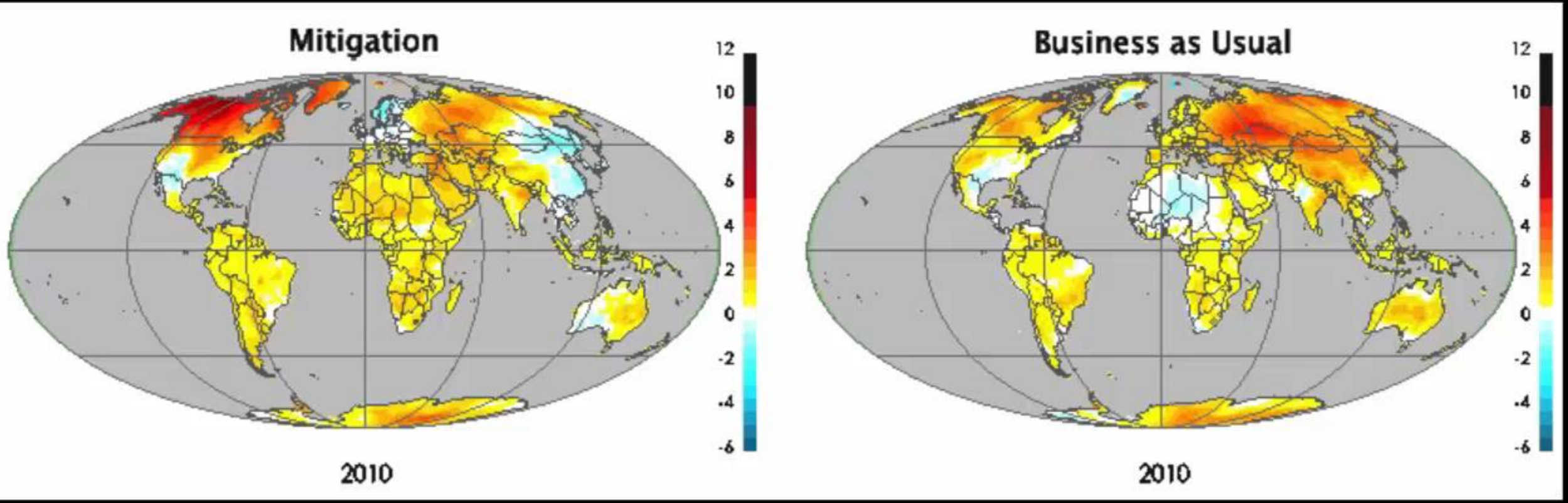






http://coolclimate.berkeley.edu/footprint

Expected temperature change (°C)



NOAA Earth System Research Laboratory

DOT:

Do One Thing

- Unplug chargers
- Carpool
- Meatless Mondays
- Walk/Bike when you can
- Turn off water when brushing teeth
- Take shorter showers
- Turn the lights out when you leave a room
- Carry a water bottle
- Reduce, reuse, recycle
- Buy local

Scientists on the Front Lines of Climate Change

THE STORY GROUP
multimedia journalism

www.thestorygroup.org

Thank you!

For more information:

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