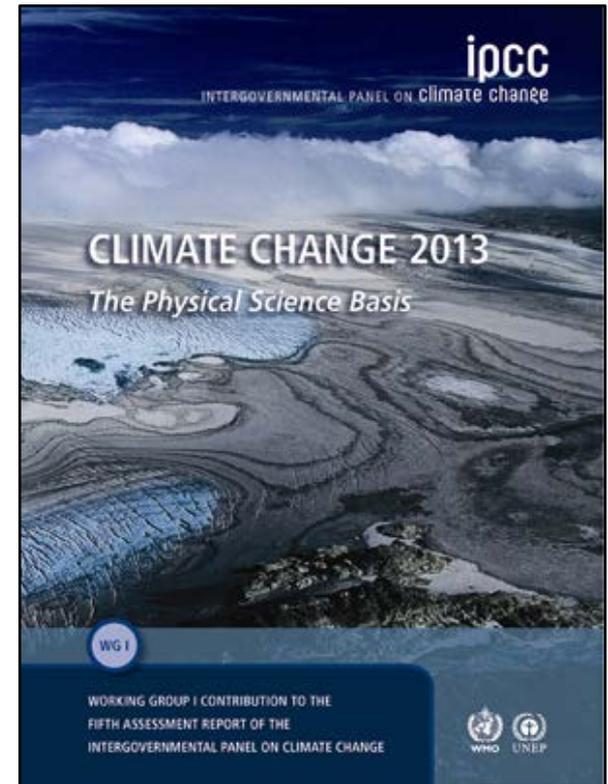
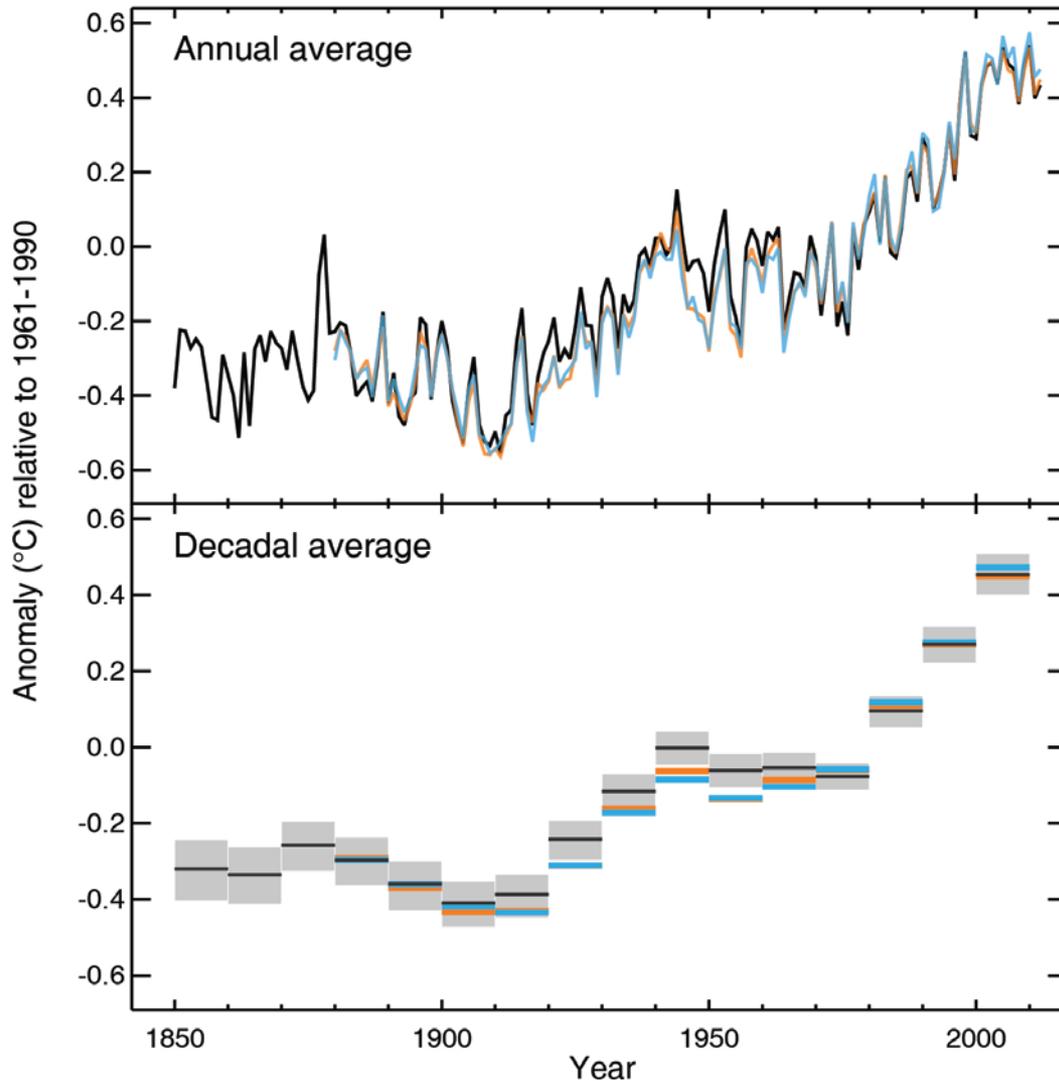


# Save the Planet...drive EV

Dr. Christopher L. Sabine  
Environmental Scientist and Director  
NOAA's Pacific Marine Environmental Laboratory

# Documented Rise in Global Surface Temperatures

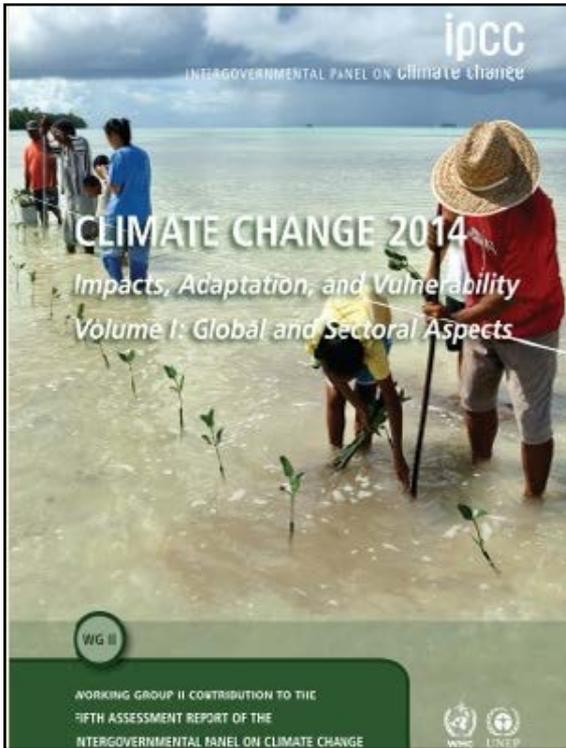
Observed globally averaged combined land and ocean surface temperature anomaly 1850–2012



Warming of the climate system is unequivocal, and since the 1950s, many of the observed changes are unprecedented over decades to millennia.

Human influence on the climate system is clear. It is extremely likely that human influence has been the dominant cause of the observed warming since the mid-20th century.

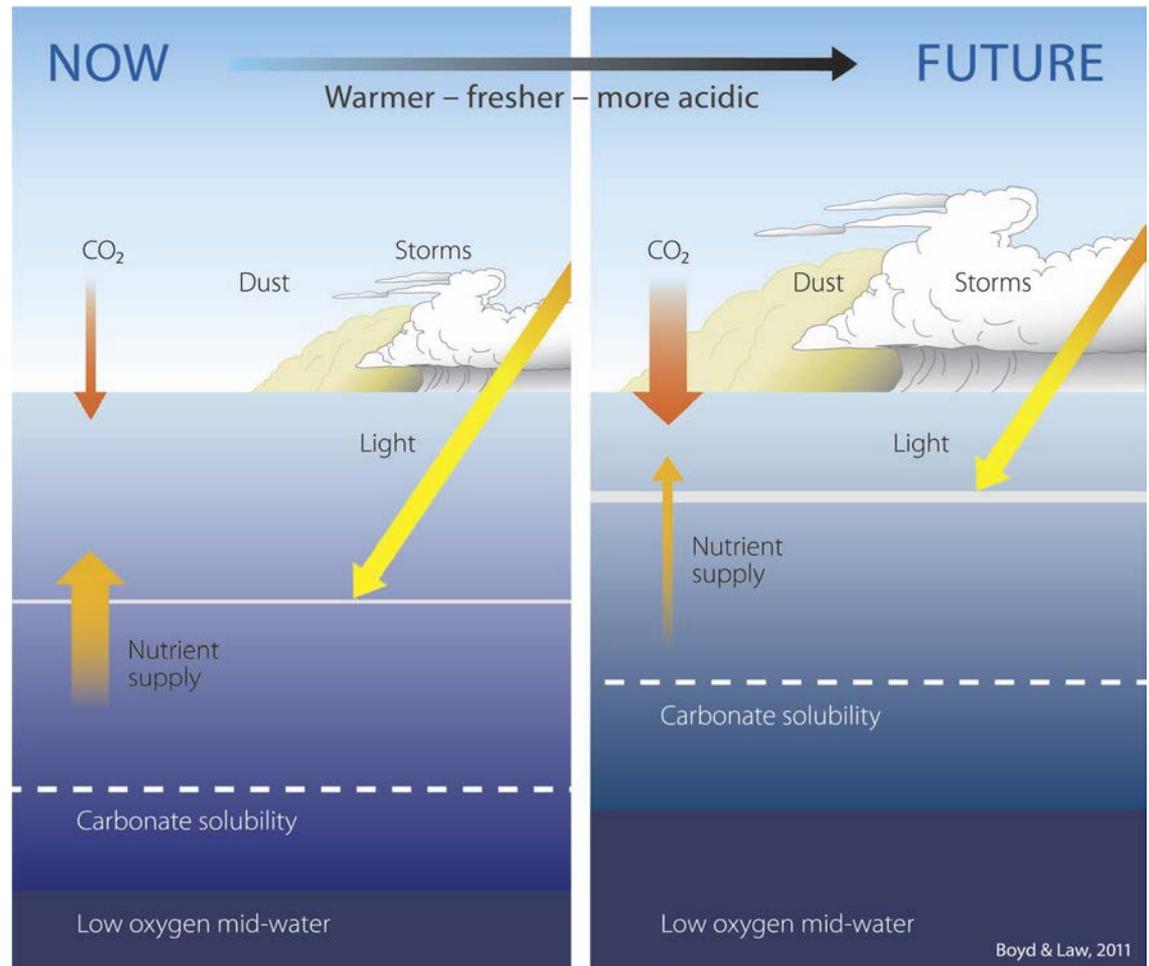
March, 2014



## Projected alteration of oceanic fluxes and atmospheric events due to a changing climate in the coming decades

In recent decades, changes in climate have caused impacts on natural and human systems on all continents and across the oceans.

Impacts from recent climate-related extremes reveal significant vulnerability and exposure of some ecosystems and many human systems to current climate variability (very high confidence).



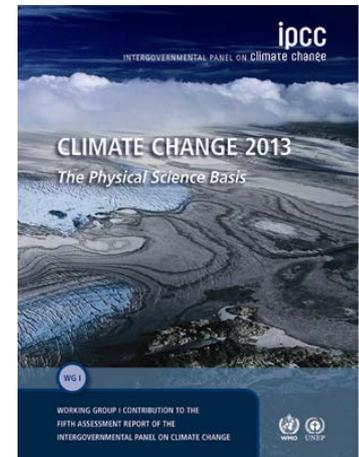
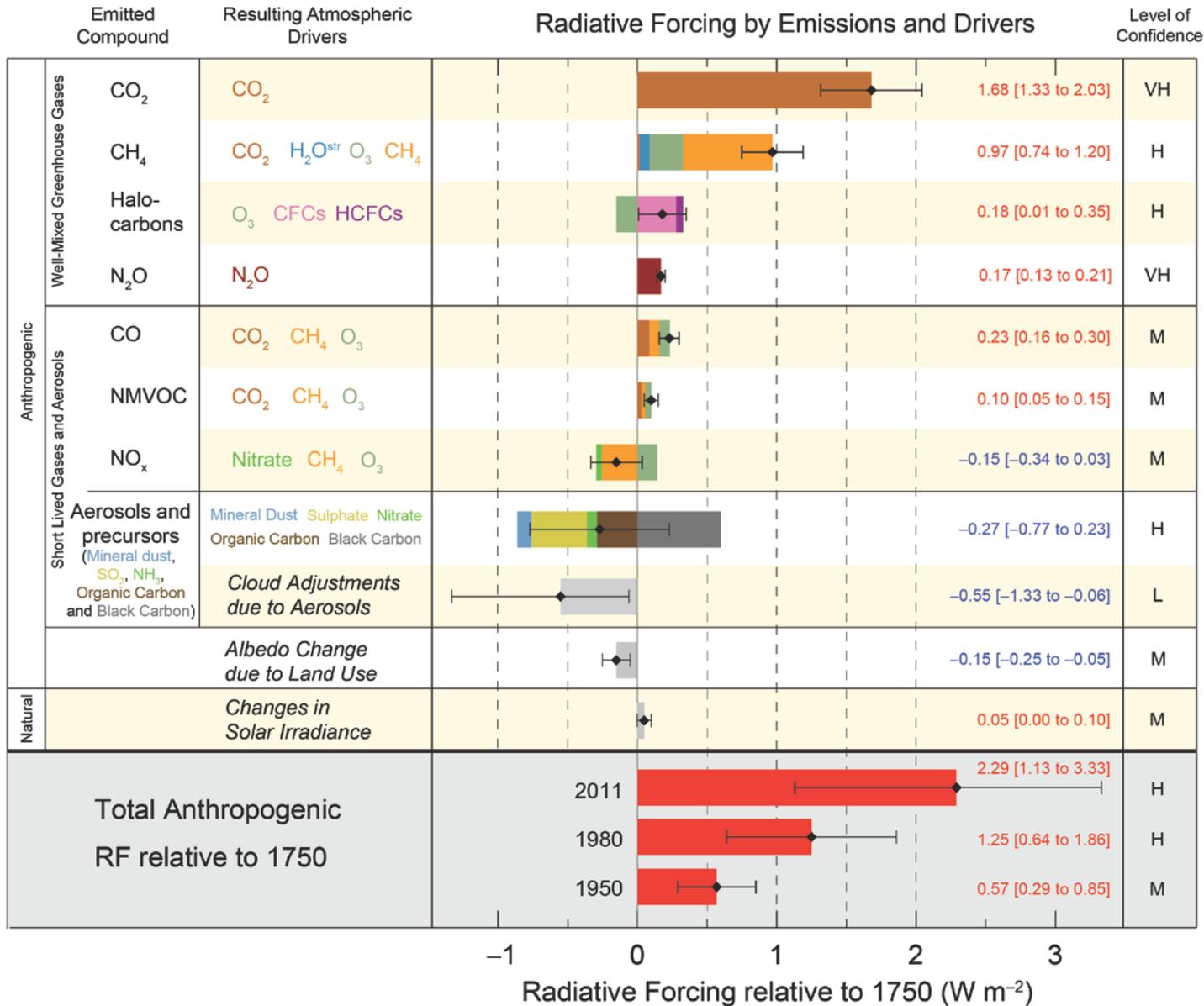
# Excerpt from President Obama's State of the Union Address February 12, 2013:



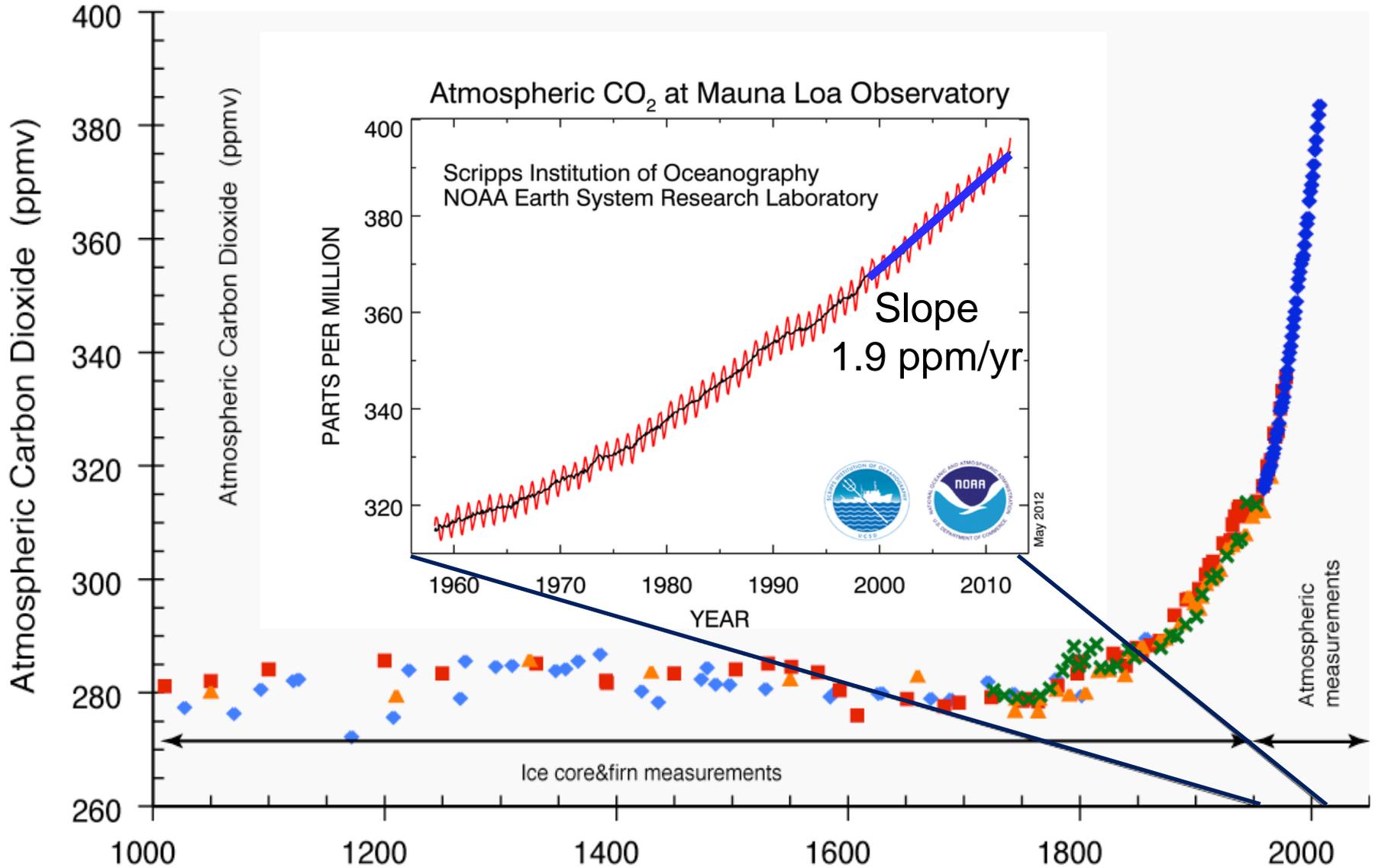
"We can choose to believe that Superstorm Sandy, and the most severe drought in decades, and the worst wildfires some states have ever seen were all just a freak coincidence, or we can choose to believe in the overwhelming judgment of science—and act before it's too late."

"If Congress won't act soon to protect future generations, I will direct my Cabinet to come up with executive actions we can take, now and in the future, to reduce pollution, prepare our communities for the consequences of climate change, and speed the transition to more sustainable sources of energy."

# What causes climate change?

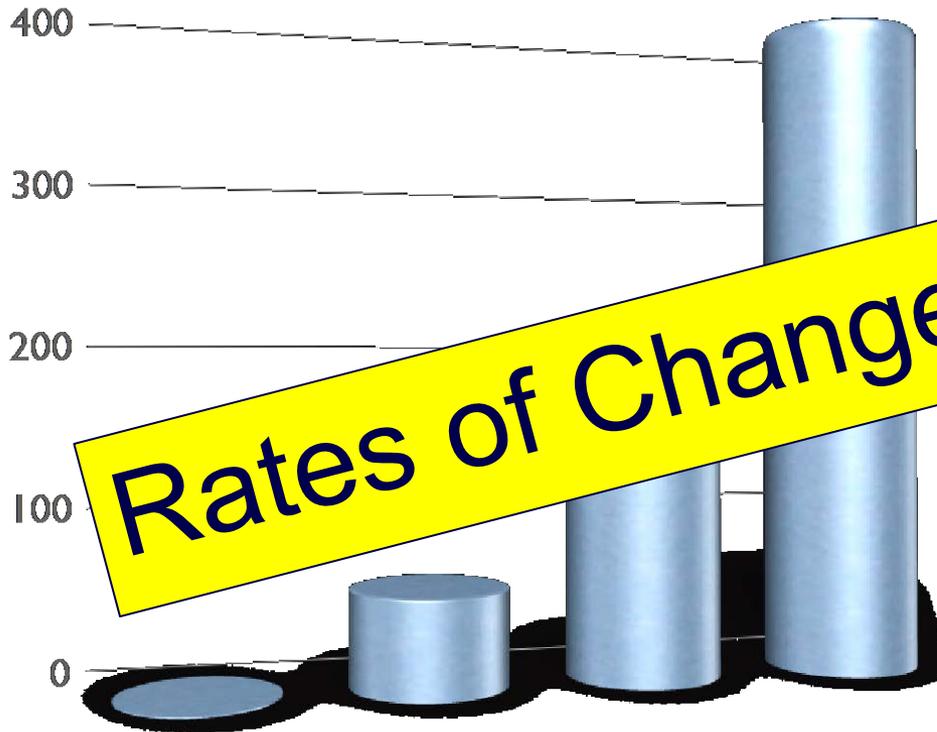


Atmospheric CO<sub>2</sub> was steady for at least 1,000 years before the industrial revolution.



# We are Experiencing Changes at an Unprecedented Rate

## Atmospheric CO<sub>2</sub> Rate of CO<sub>2</sub> Rise (ppm/100y)



## Global Temperature Rate of Temp. rise (°C/100y)

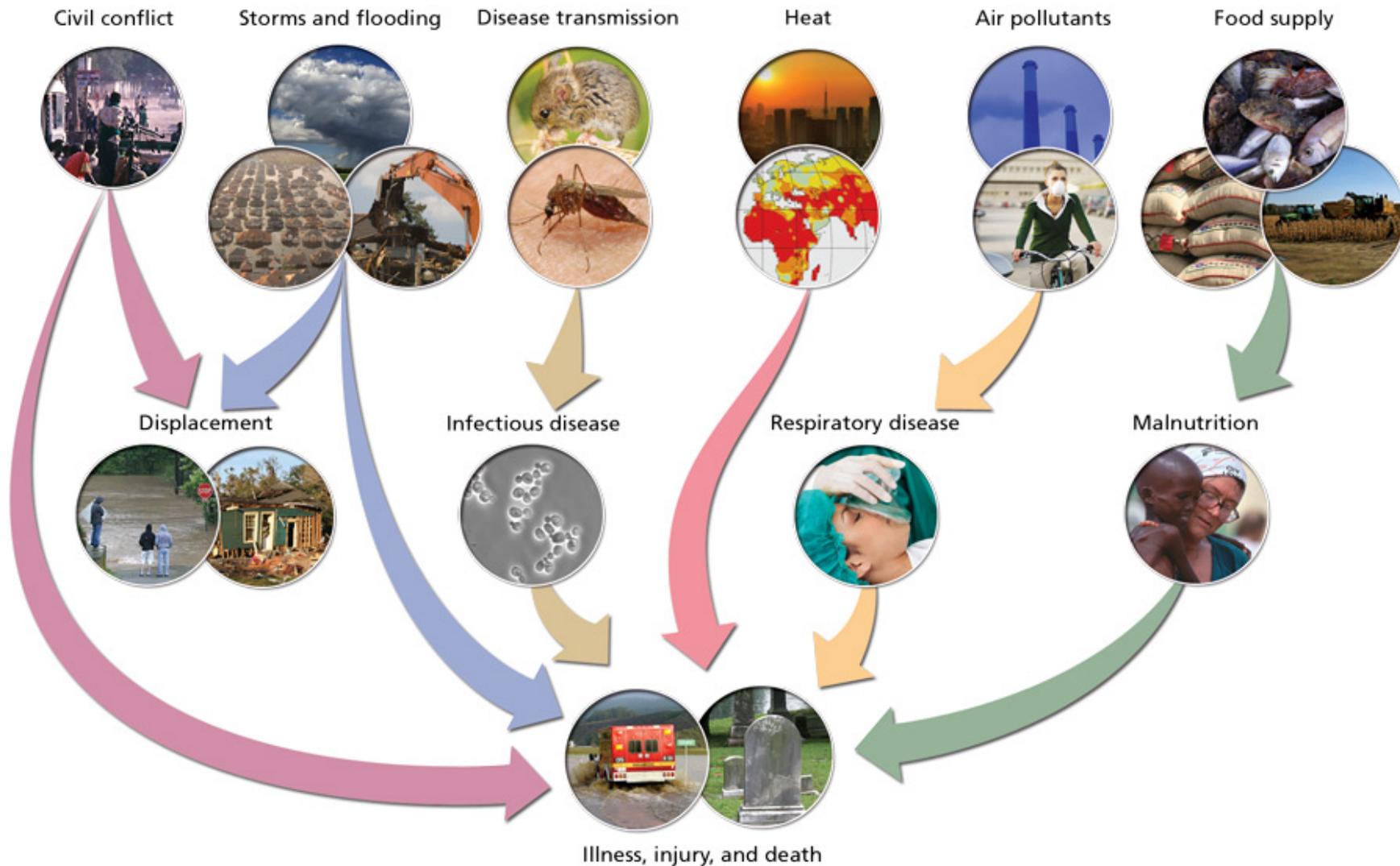


**Rates of Change are Important**

Maximum Last 420,000 y  
Last 100 y  
Next 100 y (B1)  
Next 100 y (A2)

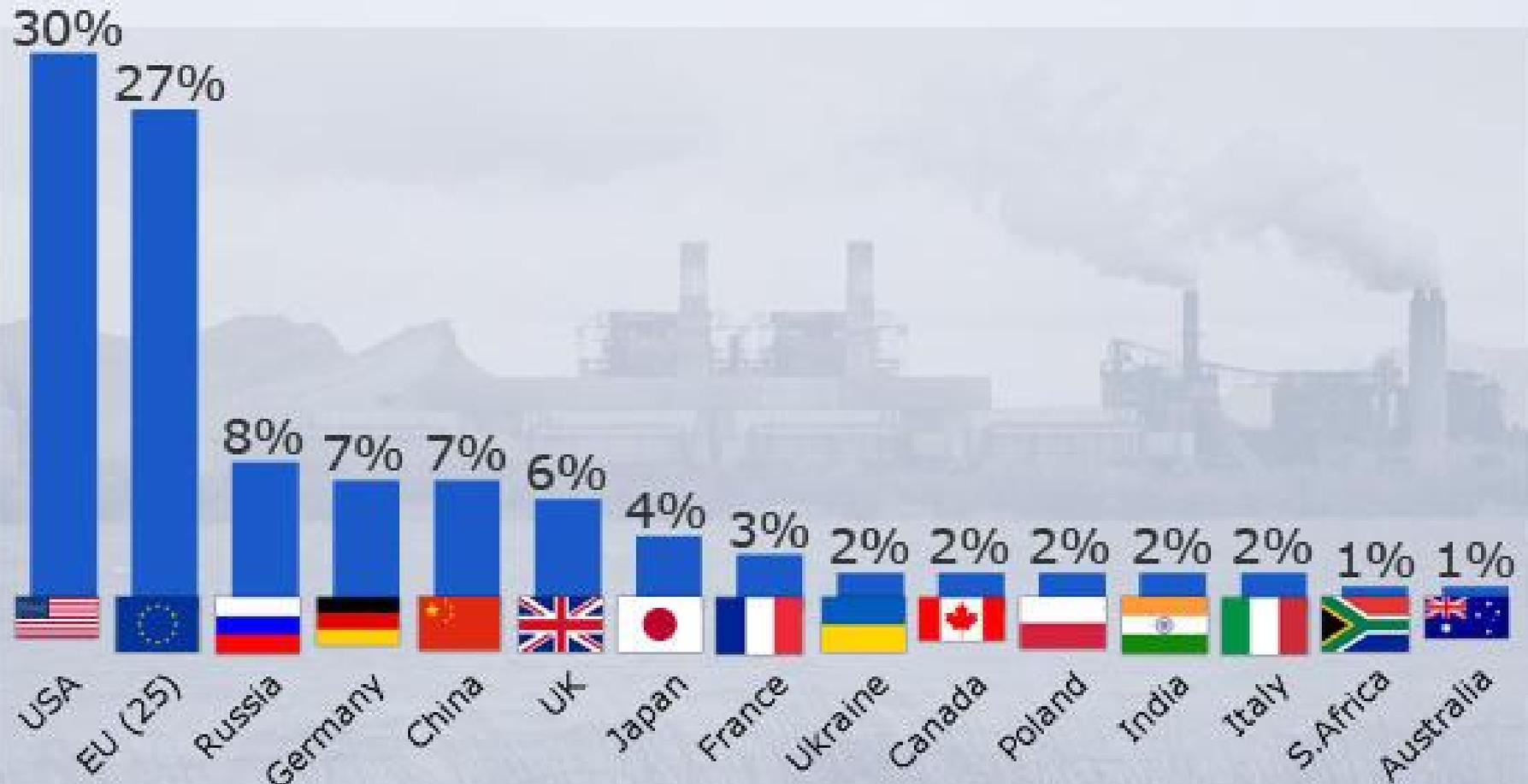
Maximum Last 420,000 y  
Last 100 y  
Next 100 y (B1)  
Next 100 y (A2)

# Why Do We Care?



The World Health Organization estimates that over the last two decades climate change has been responsible for an average of 150,000 deaths per year and they expect that rate to double over the next two decades!

# Total Emissions Between 1850 and 2000 by Country

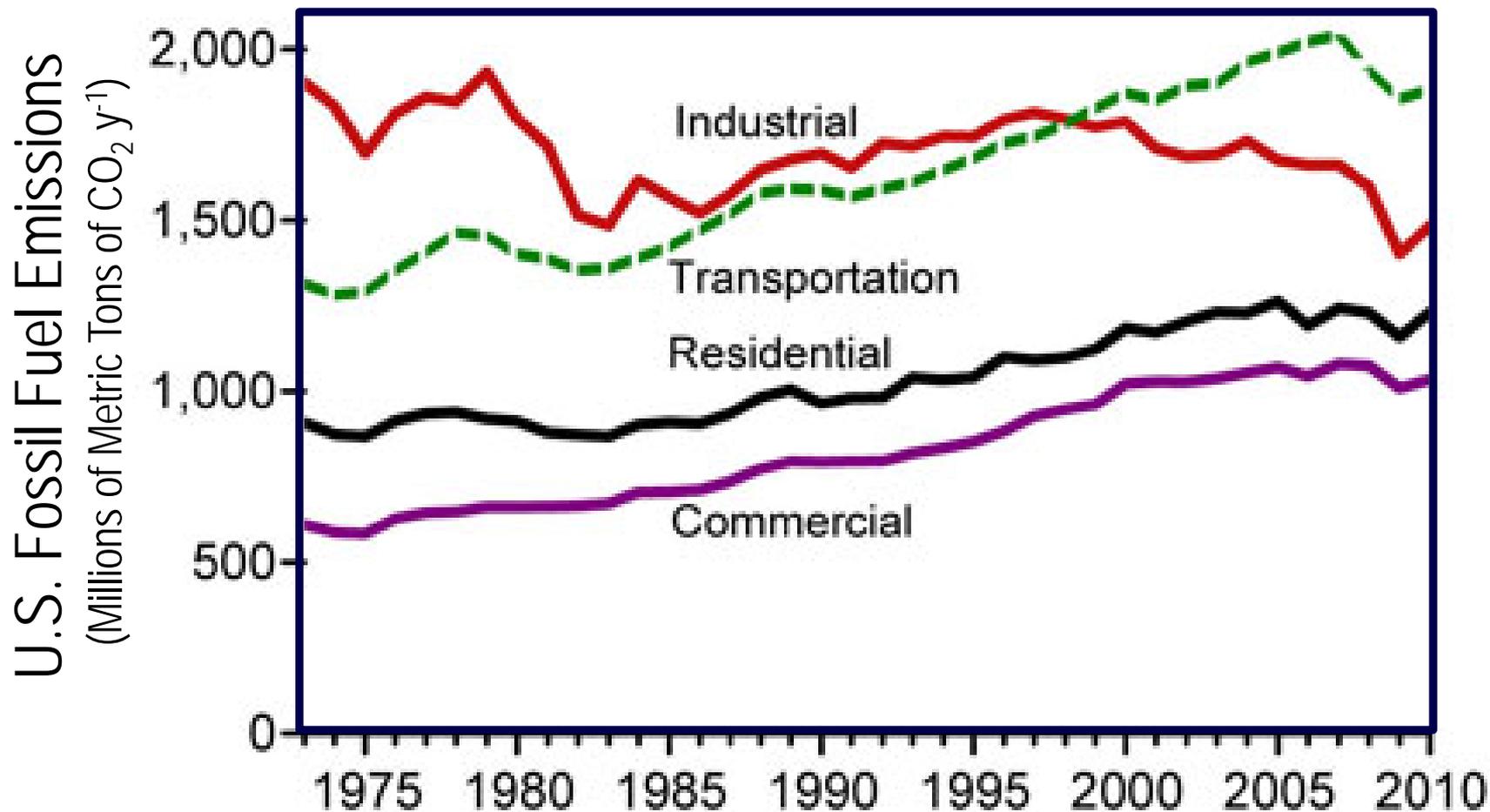


Source: World Resources Institute; photo: AP; energy-related CO<sub>2</sub> only (1850-2000)

© DW

- The US is responsible for 30% of all the human-derived CO<sub>2</sub> in the atmosphere...

# What can we do to help: Conserve Resources



28% of total emissions are for Transportation

41% of total emissions are for Electric Power

# What can we do to help: Conserve Resources



The average personal vehicle gets 17 MPG so we produce one pound of CO<sub>2</sub> for every 1.5 miles we drive

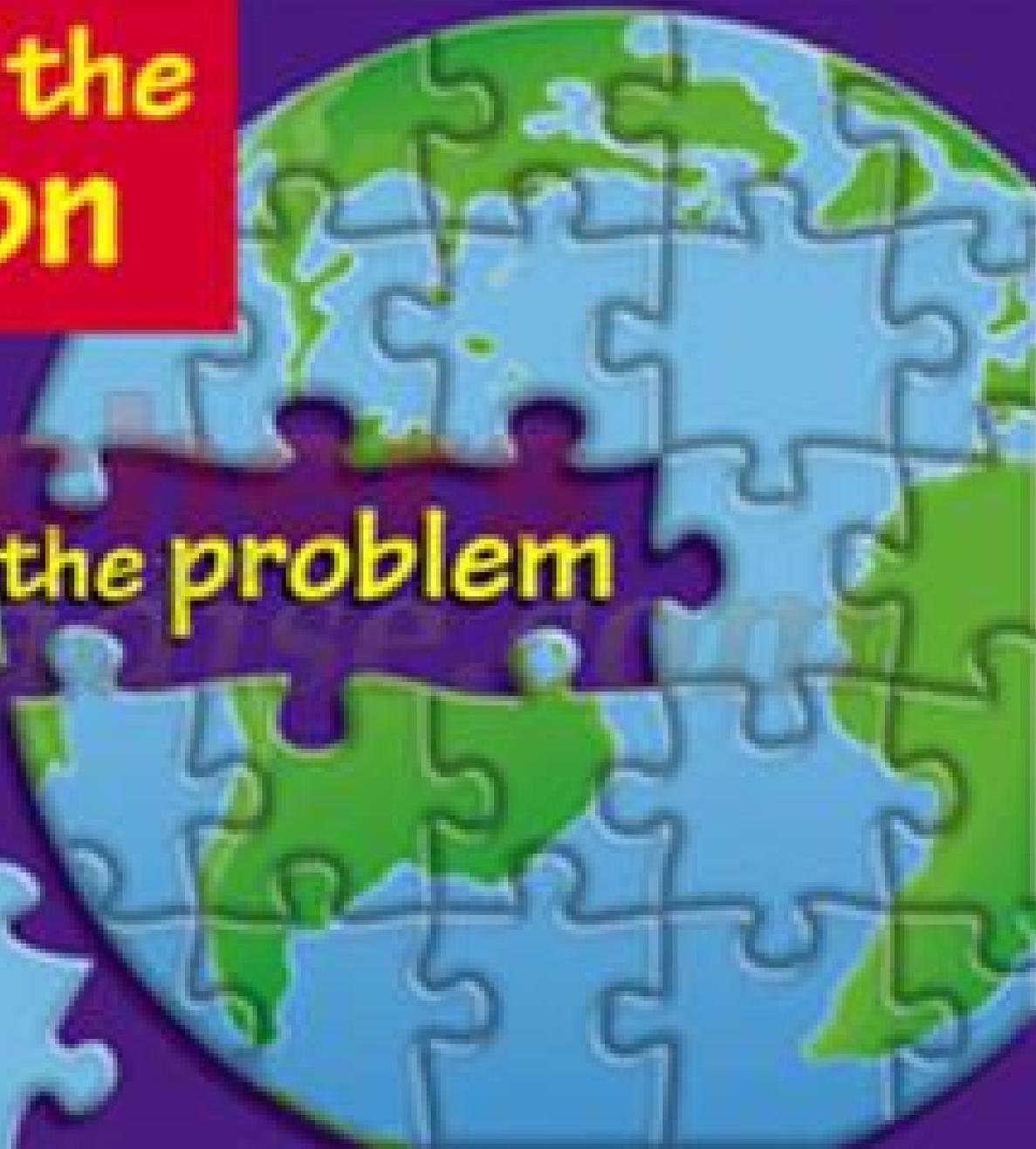
A car with 4.3 km/liter (10 mpg) better fuel efficiency reduces CO<sub>2</sub> emissions by ~2,000 kg (4,400 lb) for every 16,000 km (10,000 miles) driven annually.

Better yet, take the bus,  
train, walk  
or go electric...



Be part of the  
**solution**

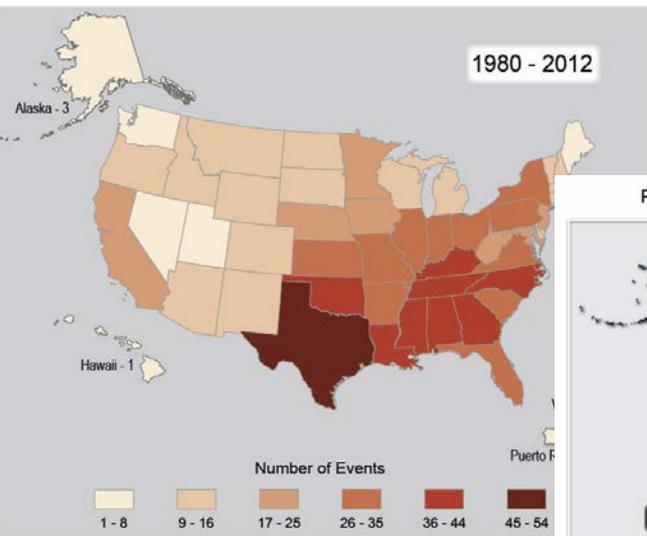
Not part of the problem



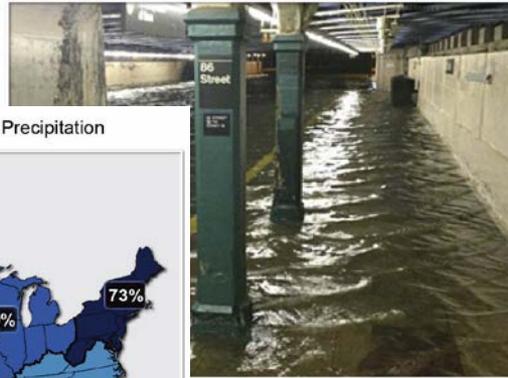


# Billion Dollar Weather/Climate Disasters

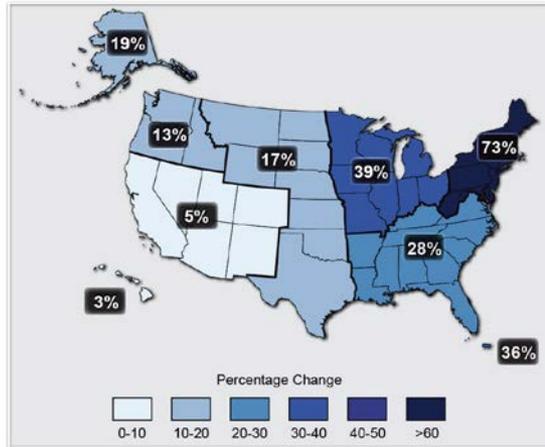
1980 - 2012



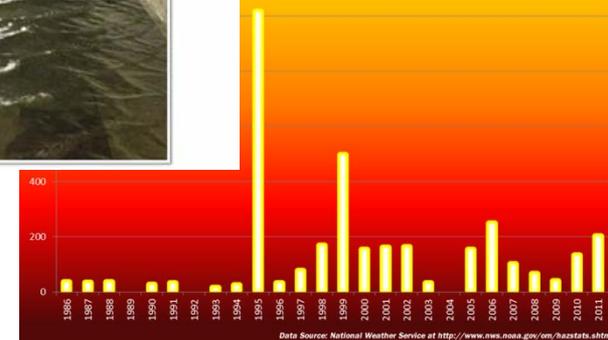
## Hurricane Sandy Causes Flooding in New York City Subway Stations



## Percentage Change in Very Heavy Precipitation



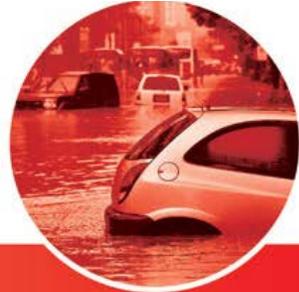
## Heat-Related Fatalities 1986-2011



SEVERE DROUGHTS



EXTREME PRECIPITATION EVENTS



COASTAL FLOODING



HEAT WAVES

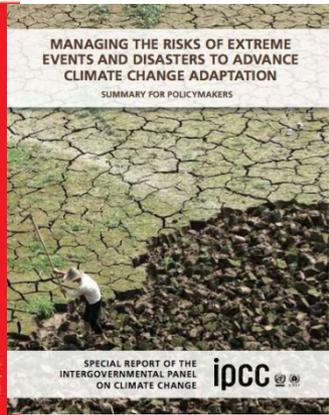


TORNADOES HURRICANES

Limited Evidence

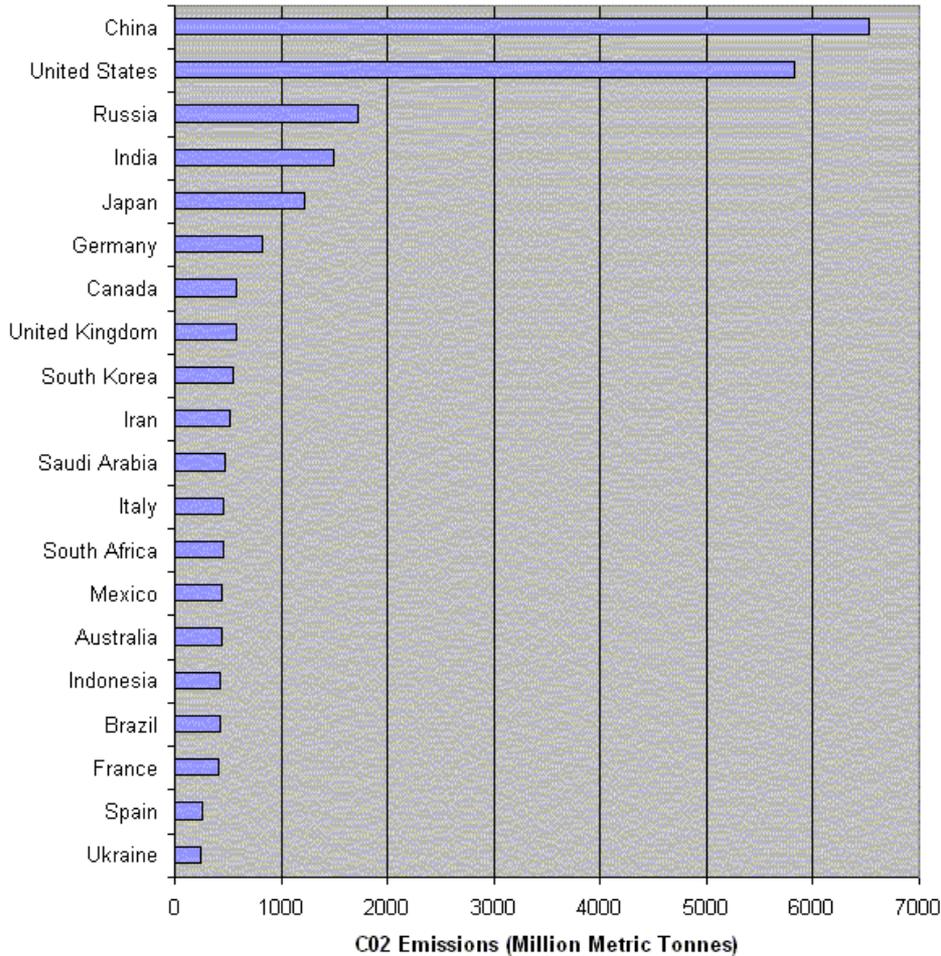
Strong Evidence

Strongest Evidence



# What can we do to help: Conserve Resources

Total 2008 CO2 Emissions



2008 CO2 Emissions per Capita

