

**intro v2**

















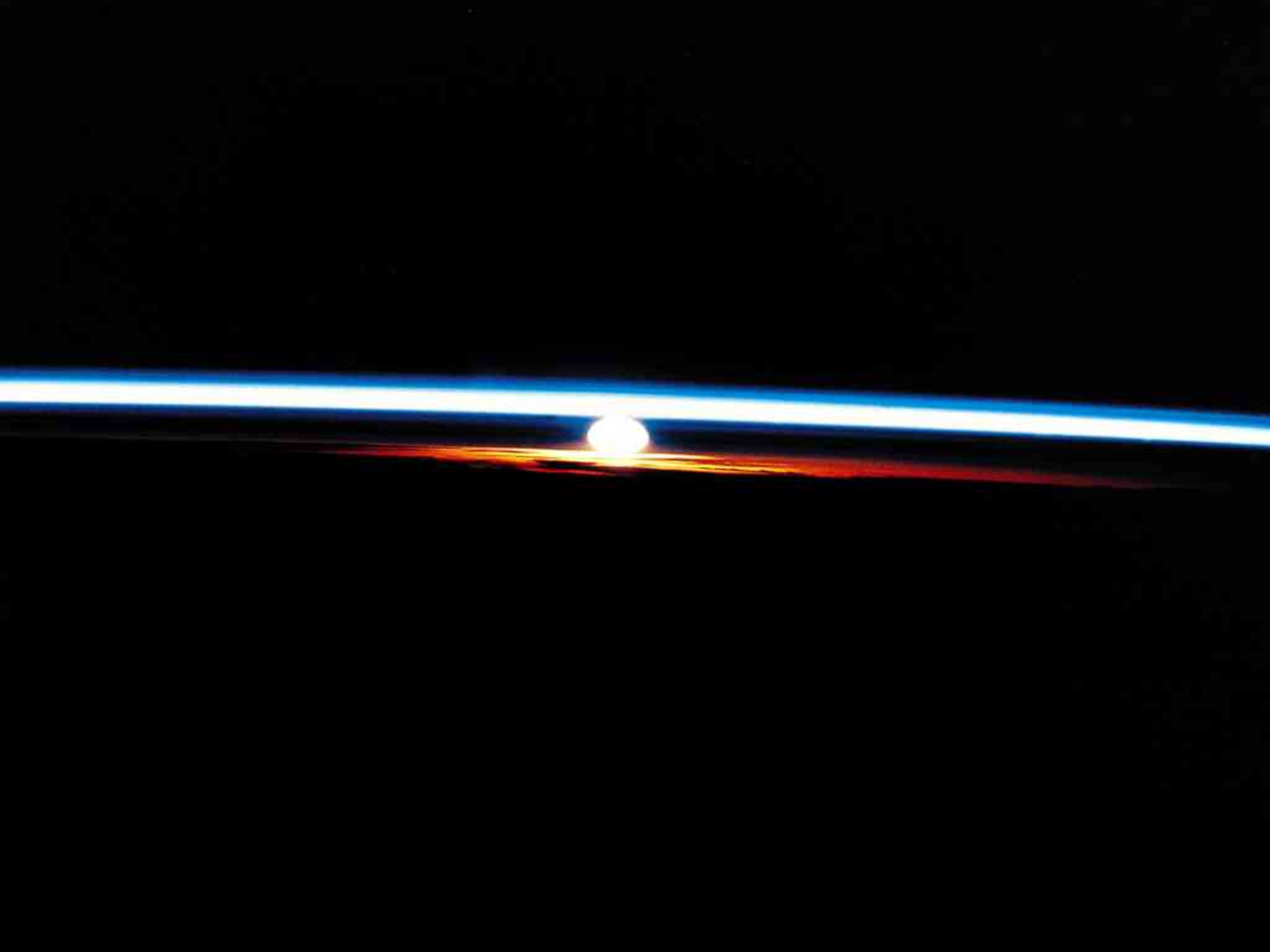












# The Greenhouse Effect

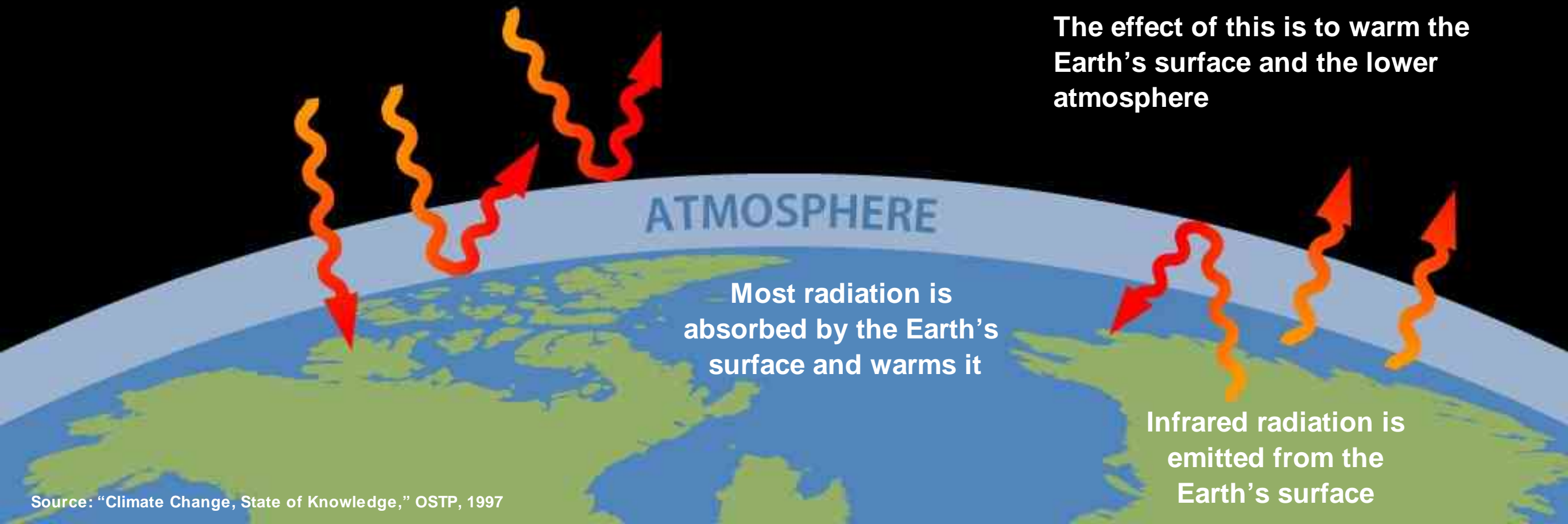


Solar radiation passes through the clear atmosphere

Some solar radiation is reflected by the Earth and the atmosphere

Some of the infrared radiation passes through the atmosphere, and some is absorbed and re-emitted in all directions by greenhouse gas molecules.

The effect of this is to warm the Earth's surface and the lower atmosphere



Most radiation is absorbed by the Earth's surface and warms it

Infrared radiation is emitted from the Earth's surface



# GLOBAL WARMING

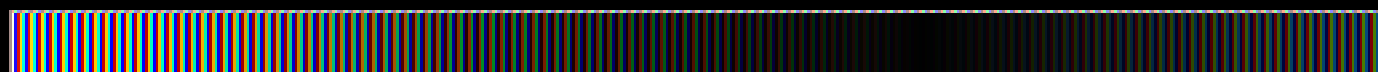
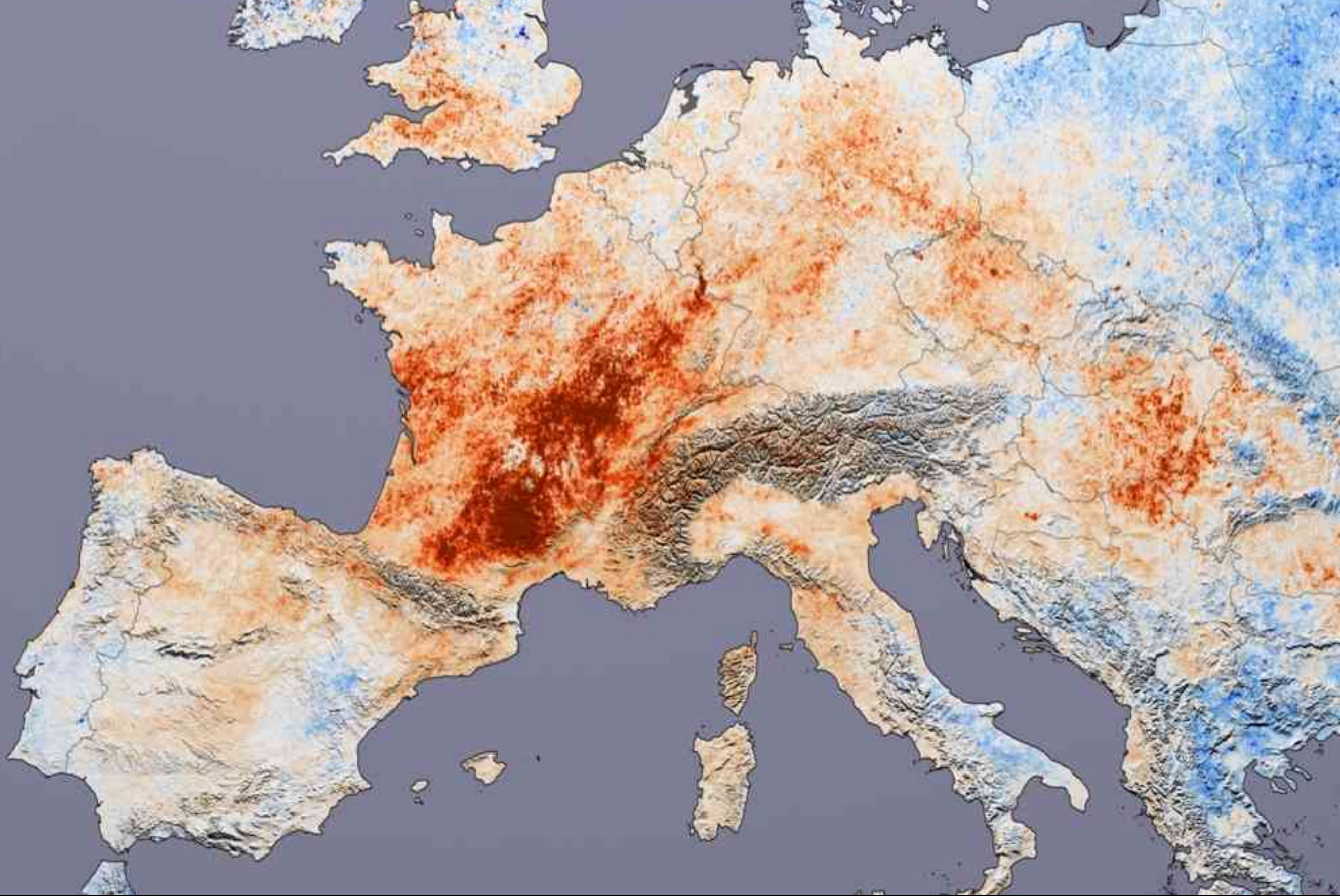


# 2003 Heat Wave in Europe



**Munich Zoo; August 2003**







# 2003 Heat Wave in Europe



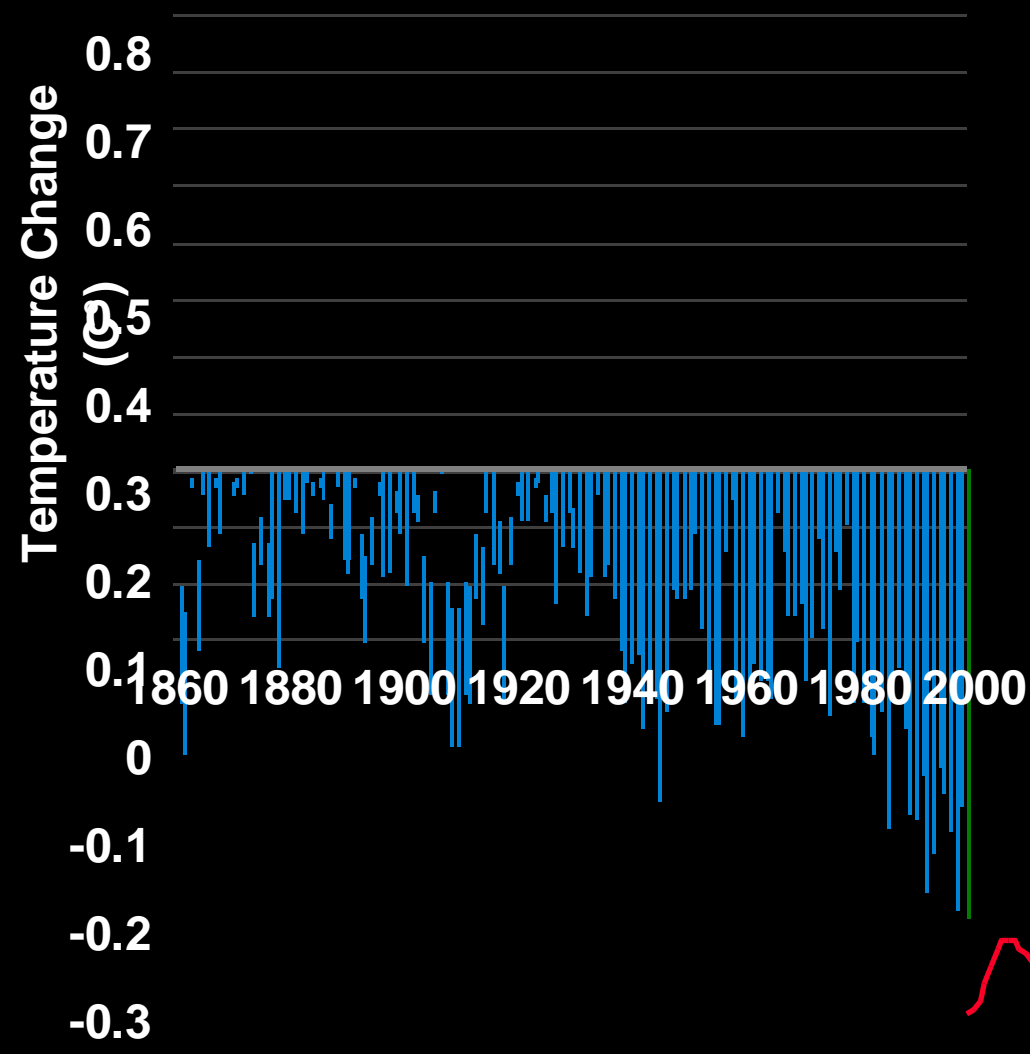
## ESTIMATED DEAD

France	11,400
Netherlands	1,400
Portugal	1,300
Italy	1,000
UK	900
Spain	100



# Global Observed Temperatures

Combined global land, air, and sea surface temperatures from 1860 to August 1998 (relative to 1961-1990 average)



**Glaciers**

# Kilimanjaro

## Africa



1970



2000









Lonnie G. Thompson



# Glaciar Lanín Norte



1896



2001

# Glacier #1

## China



1990



2001



# Glacier National Park

## Grinnel Glacier



**1910**



**1998**

# Glacier National Park

## Boulder Glacier



**1932**

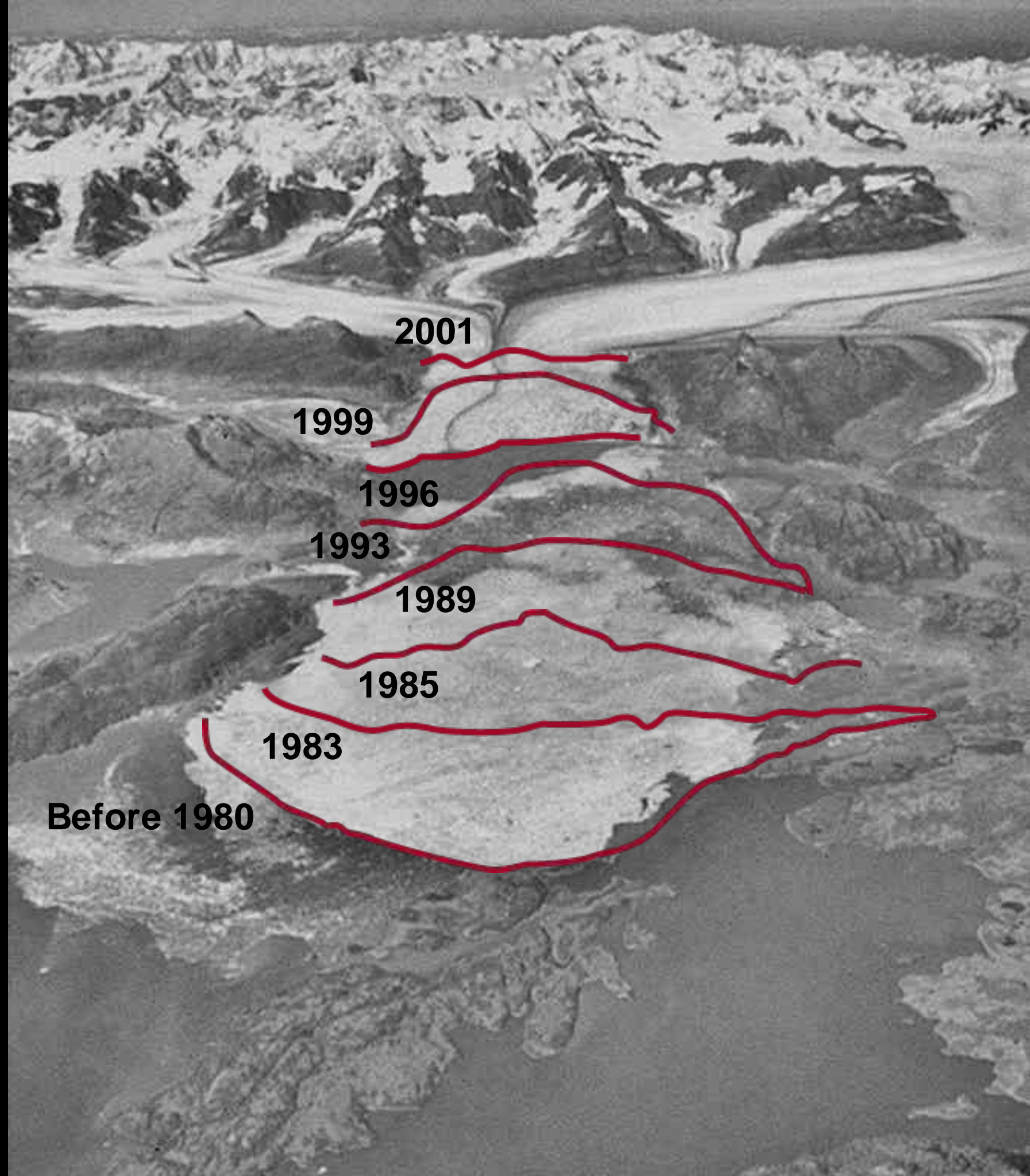


**1988**





# Wastage of Columbia Glacier, Alaska



Meier and Dyurgerov  
*Science*, 297, 2002

aerial photo taken 1996









**Denial ain't just a river in Egypt**

**Dire Straits**













Lonnie G. Thompson

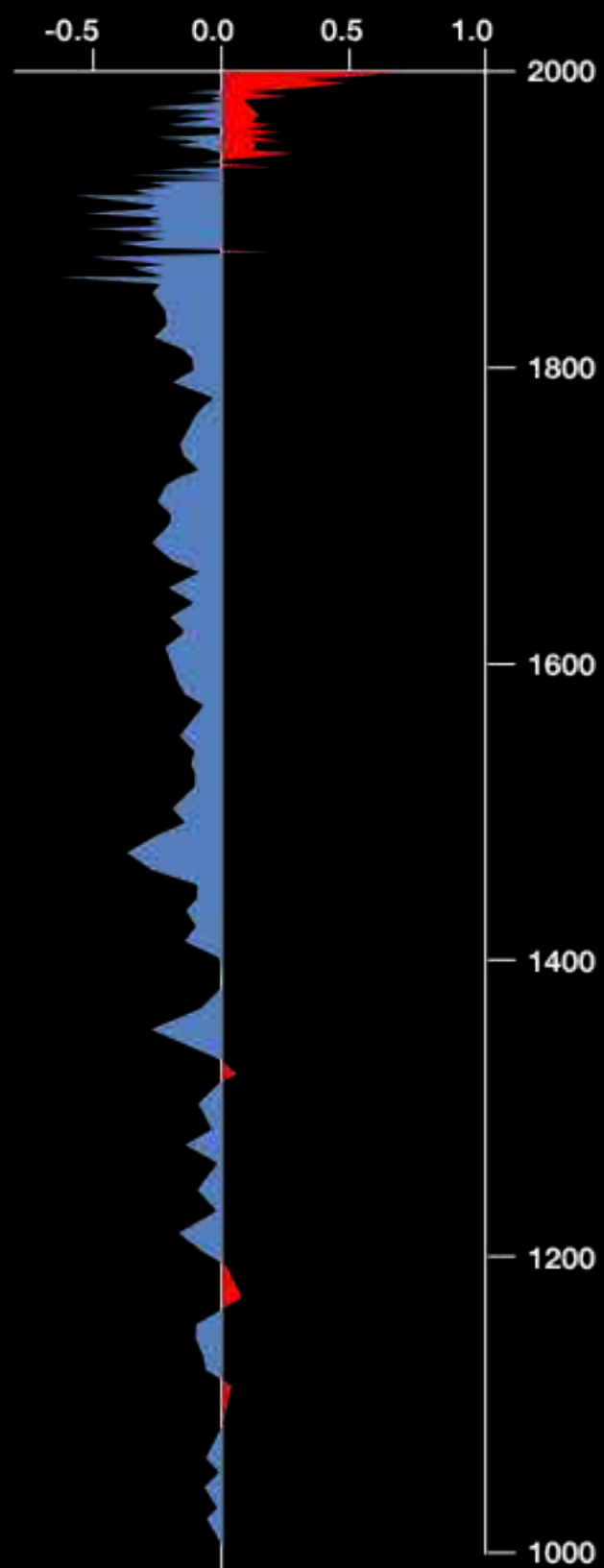


Quelccaya Ice Cap,  
Peru, 1977





# Northern Hemisphere Temperature (C°)







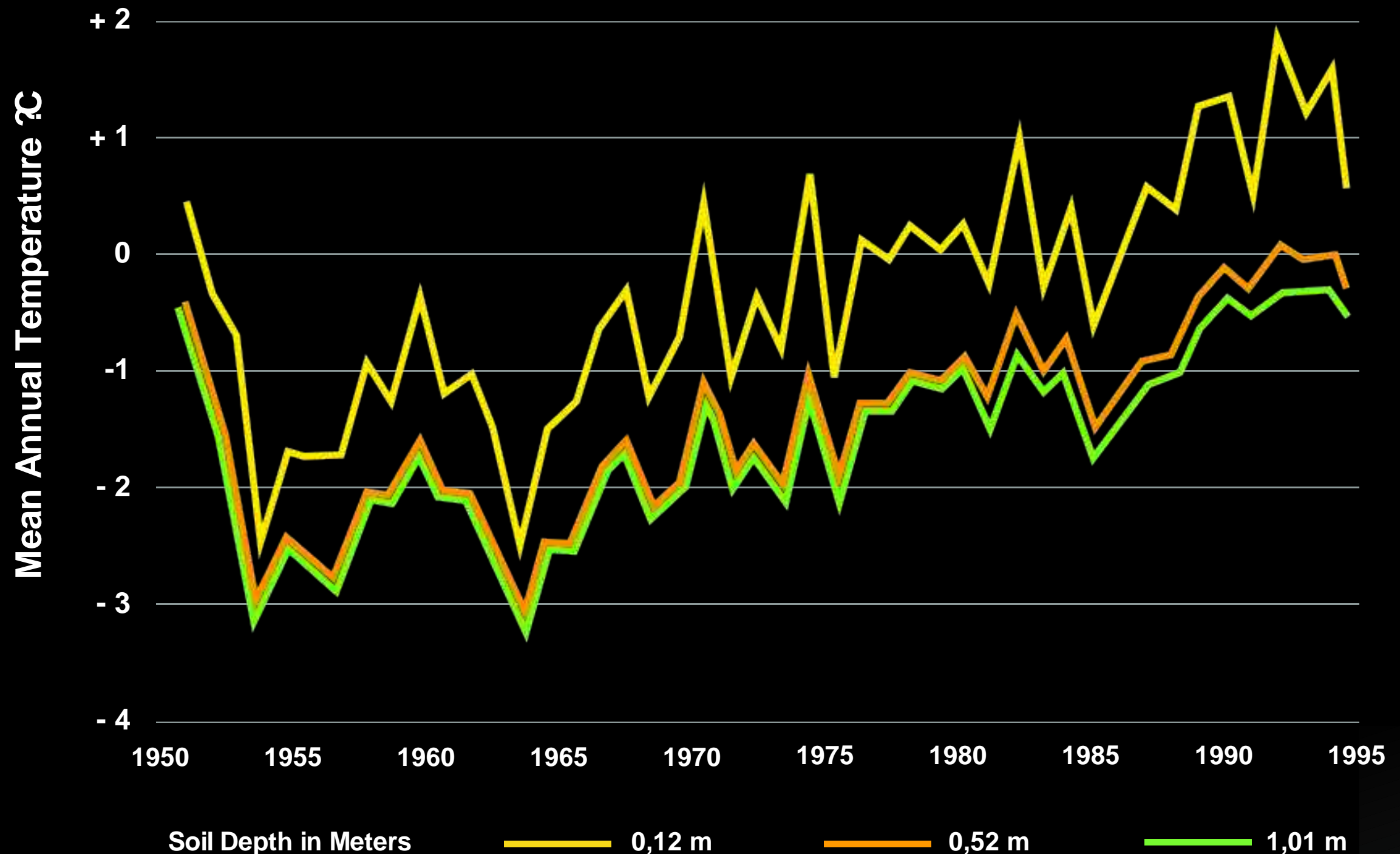
# THE HUNTER FROM 20000 B.C.

of the  
nt ice came  
pse, clinging  
crets about  
way we were

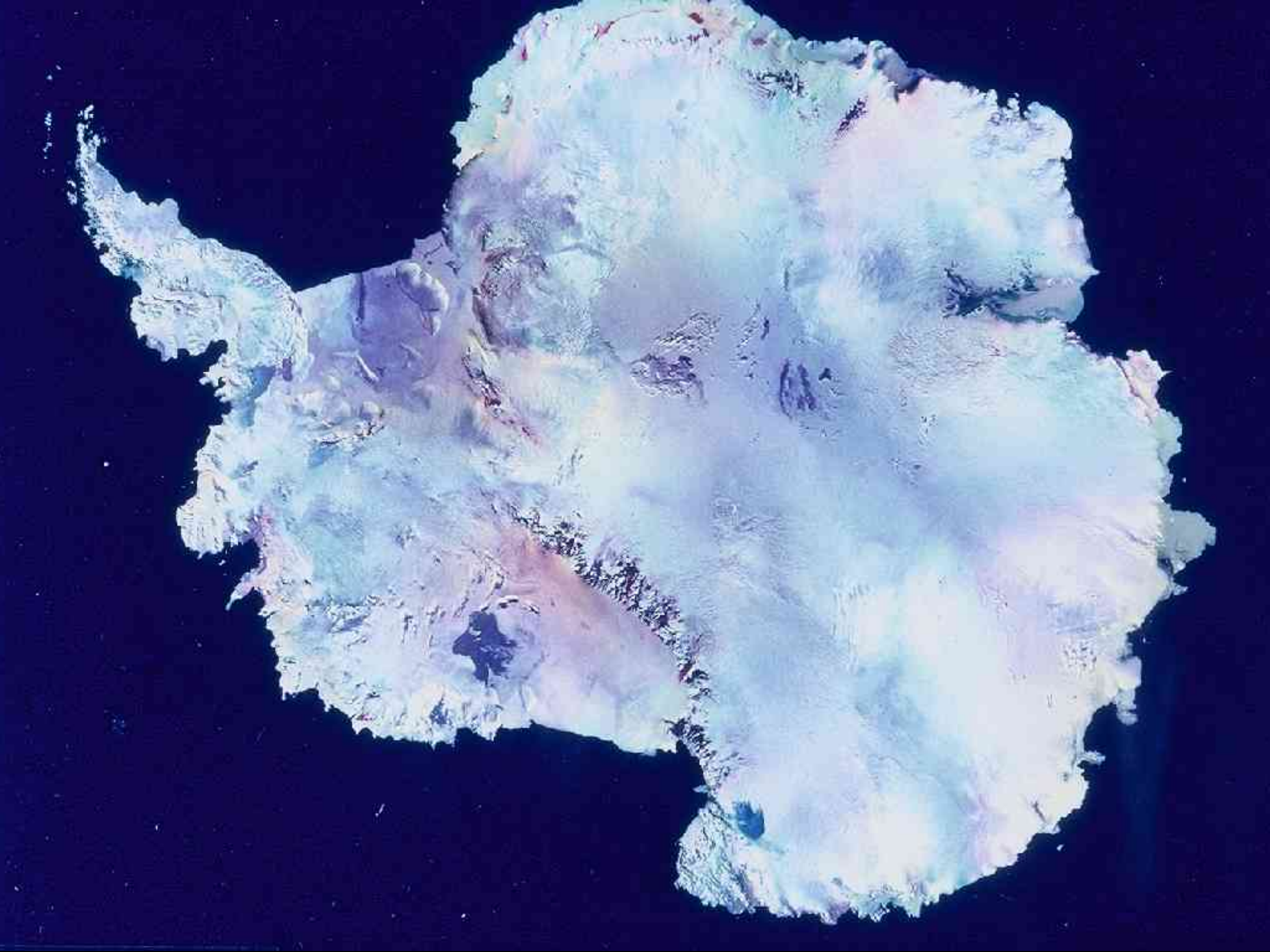


# Change in Permafrost Temperatures

at Various Depths in Fairbanks, Alaska

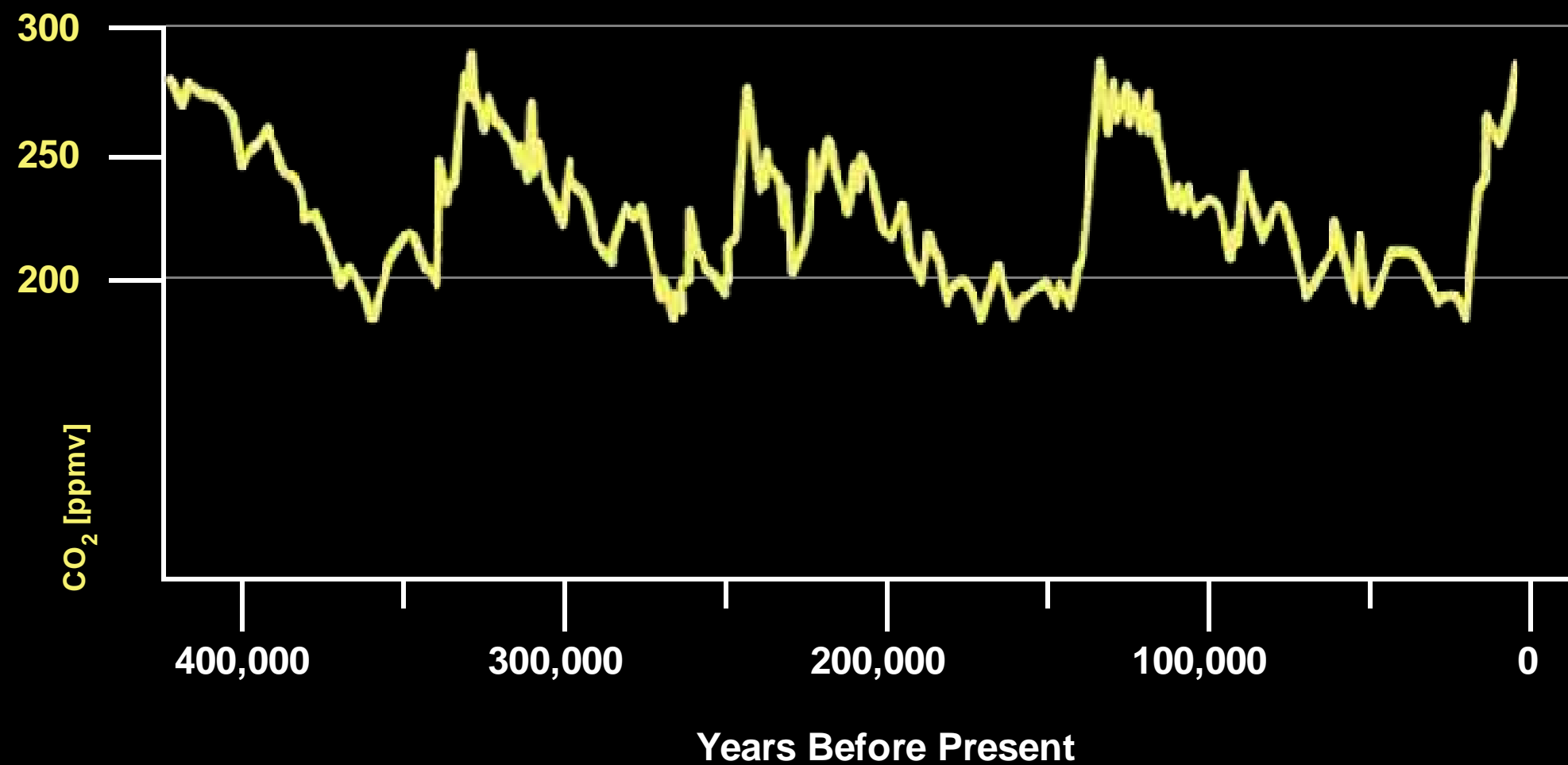




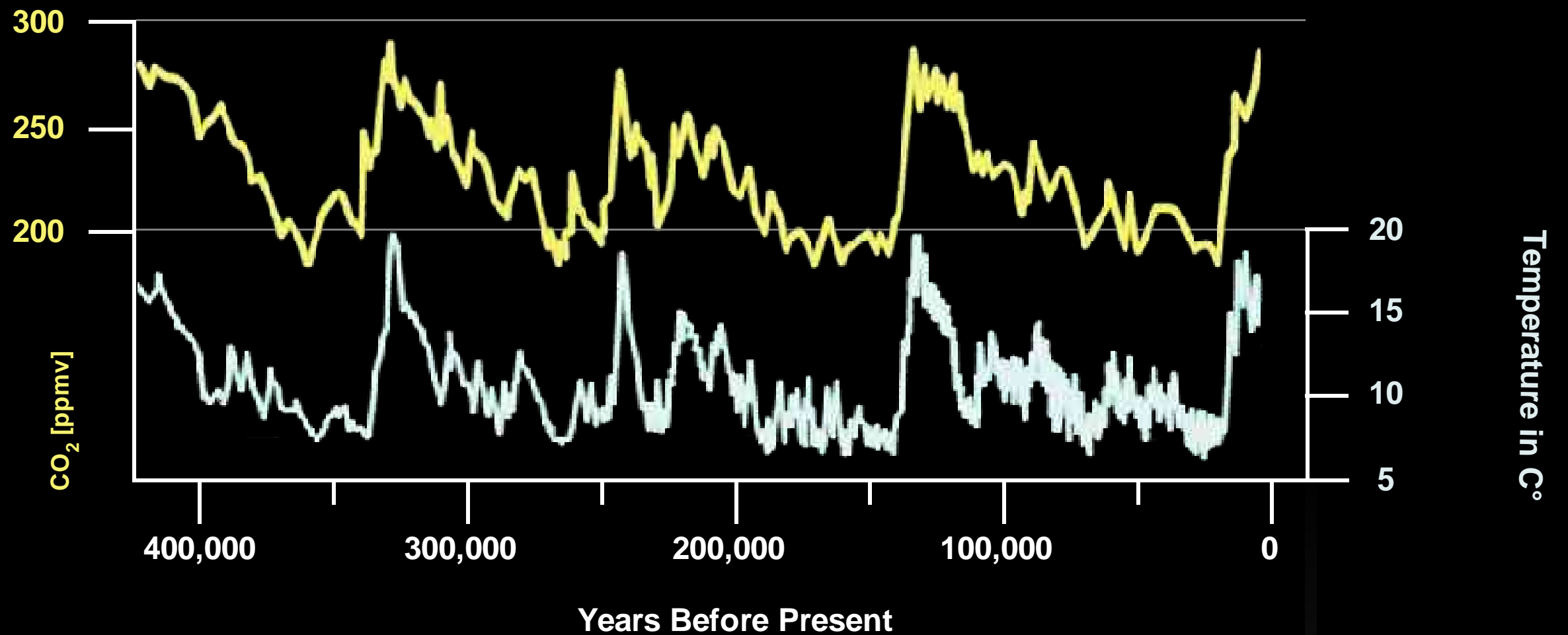


# CO<sub>2</sub> Concentration

[ppmv]

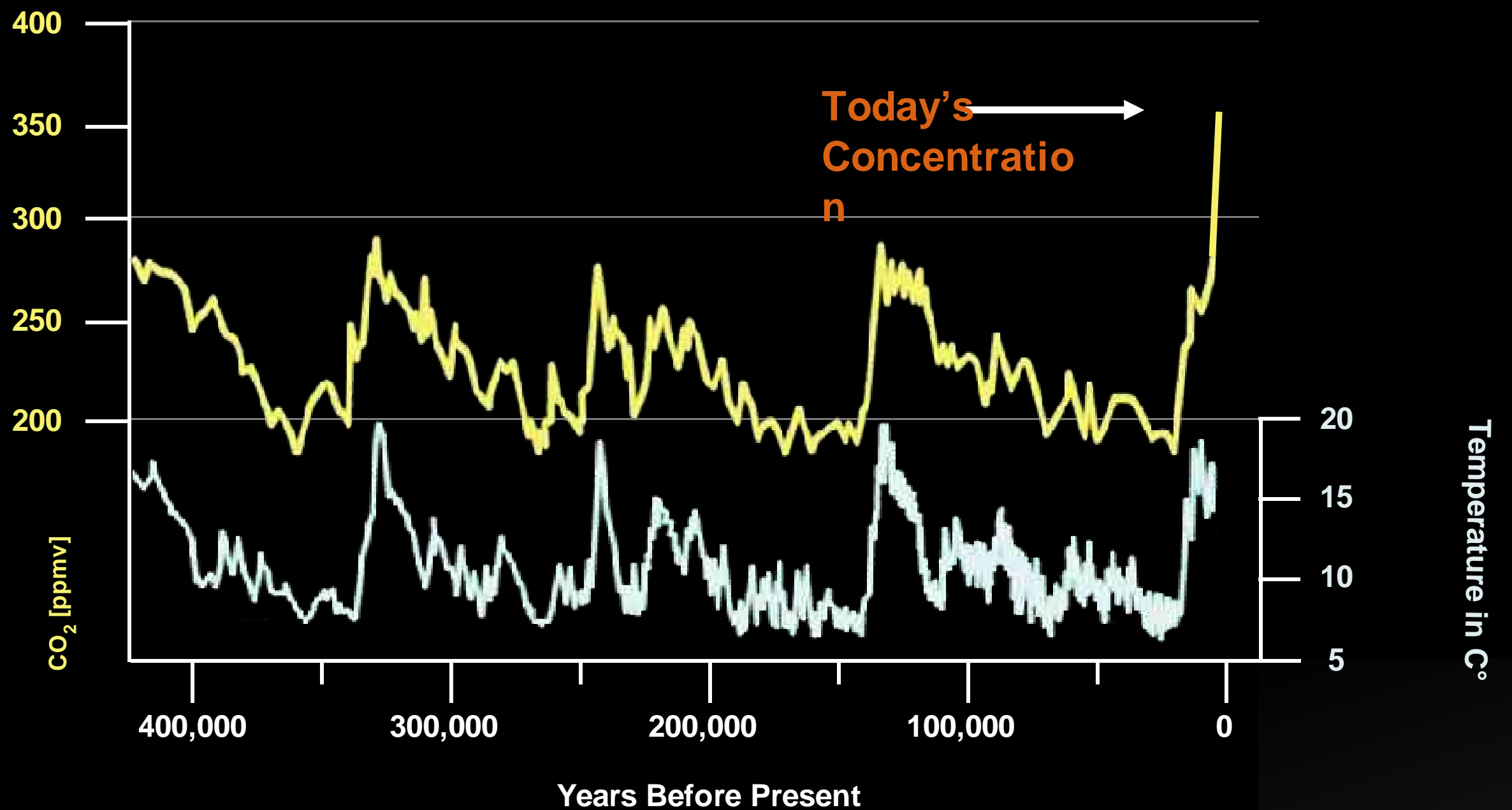


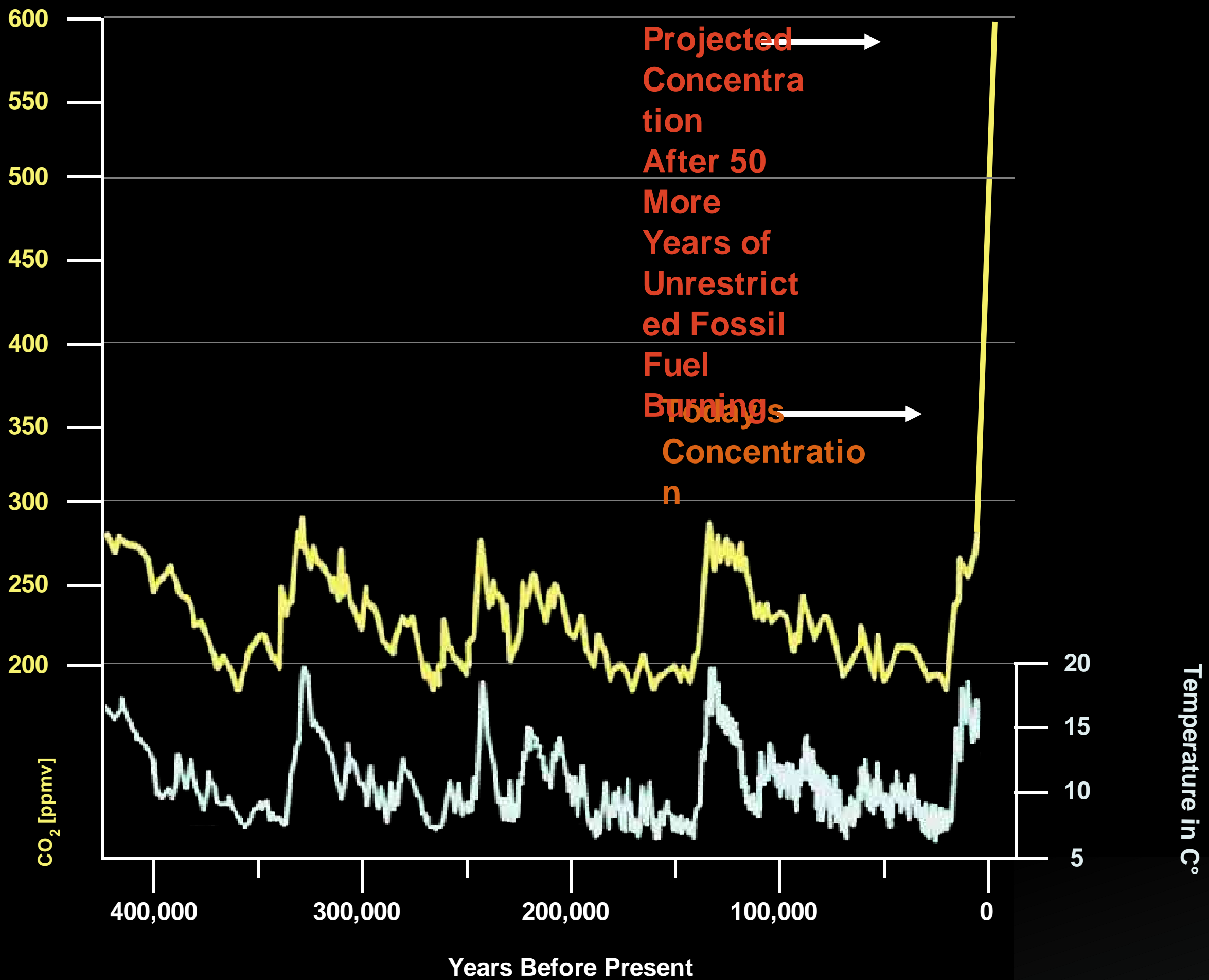
# CO<sub>2</sub> and Temperature





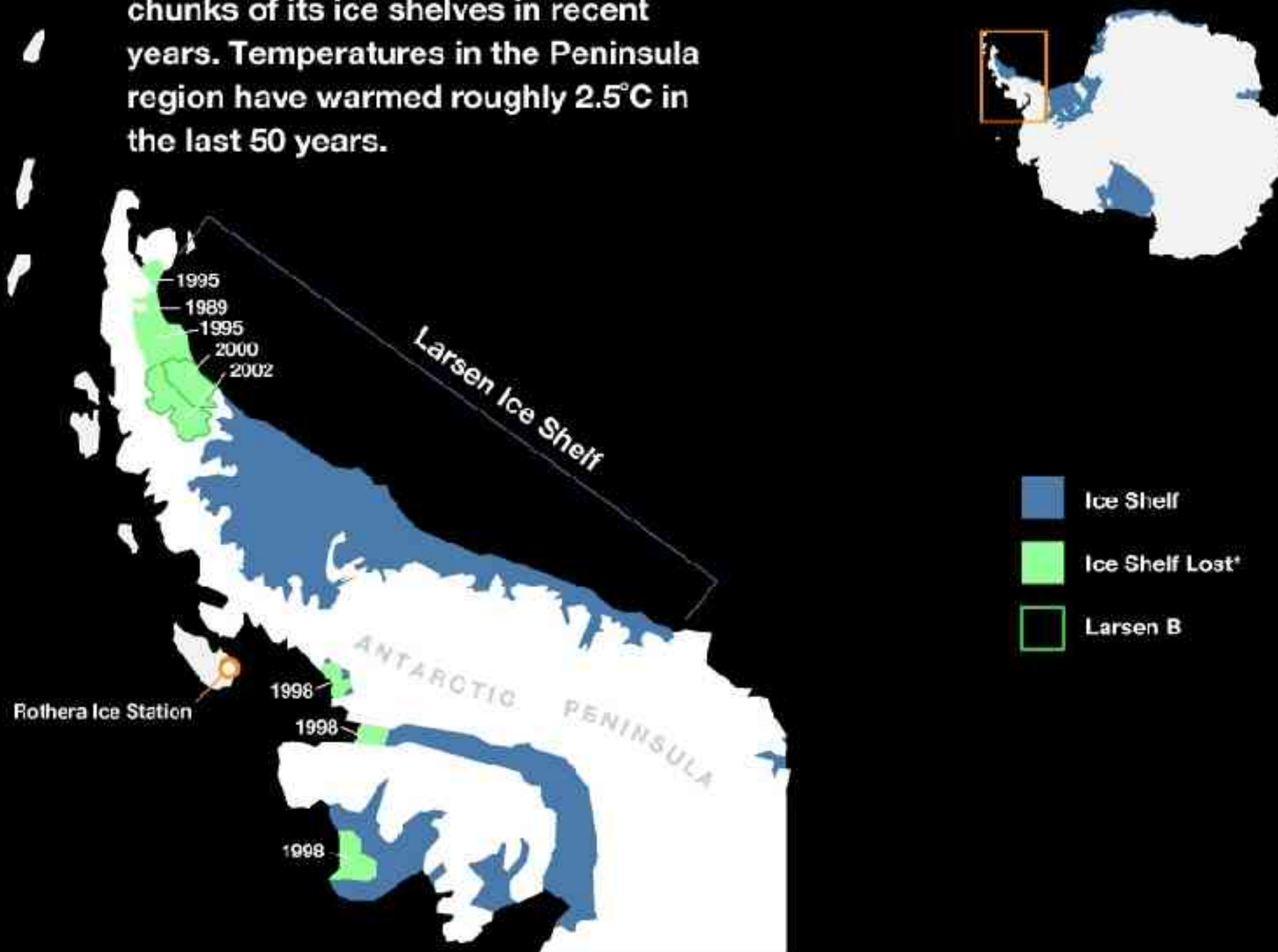
# CO<sub>2</sub> and Temperature





# Disappearing Ice Shelf

The Antarctic Peninsula has lost large chunks of its ice shelves in recent years. Temperatures in the Peninsula region have warmed roughly 2.5°C in the last 50 years.

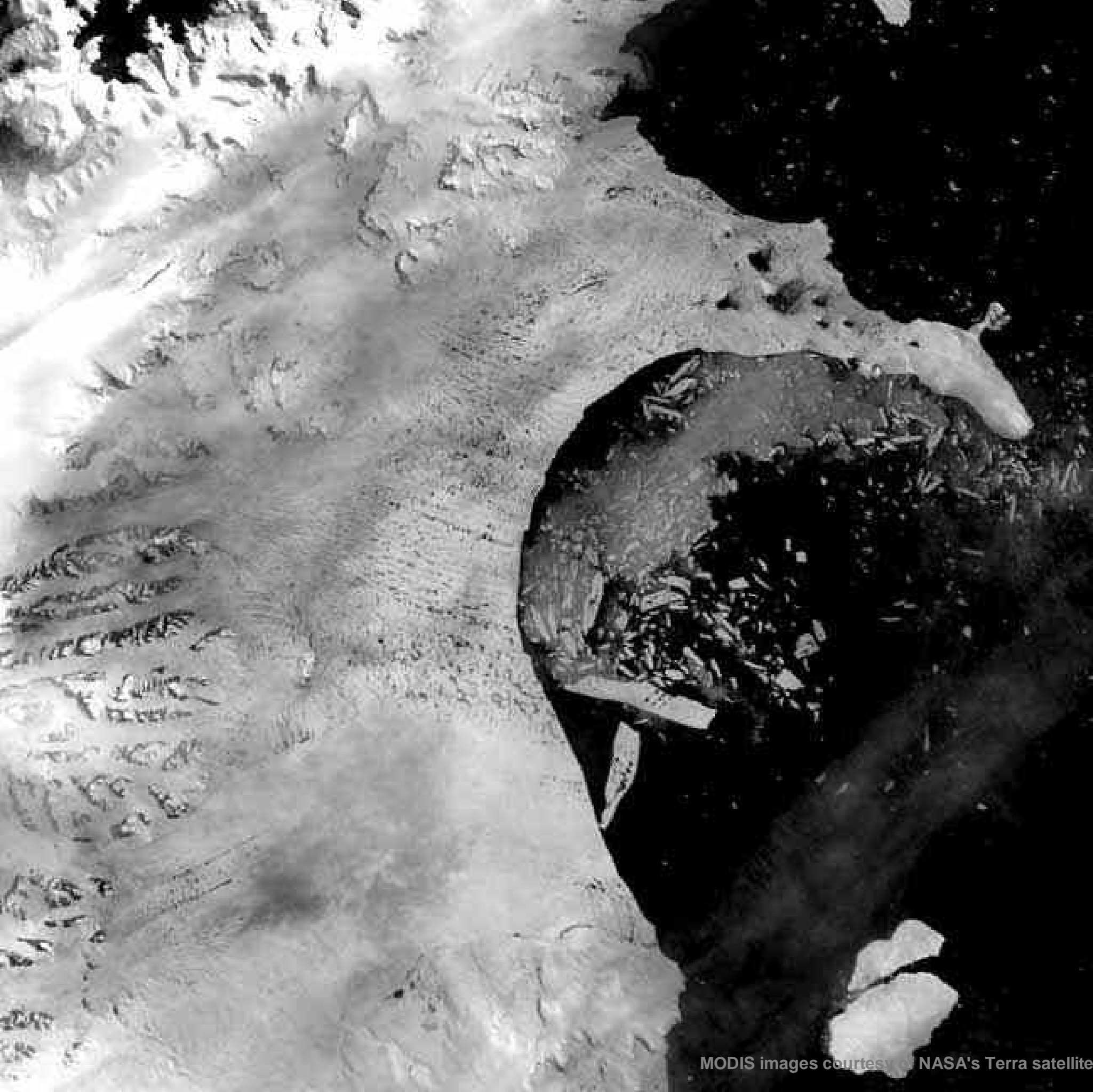






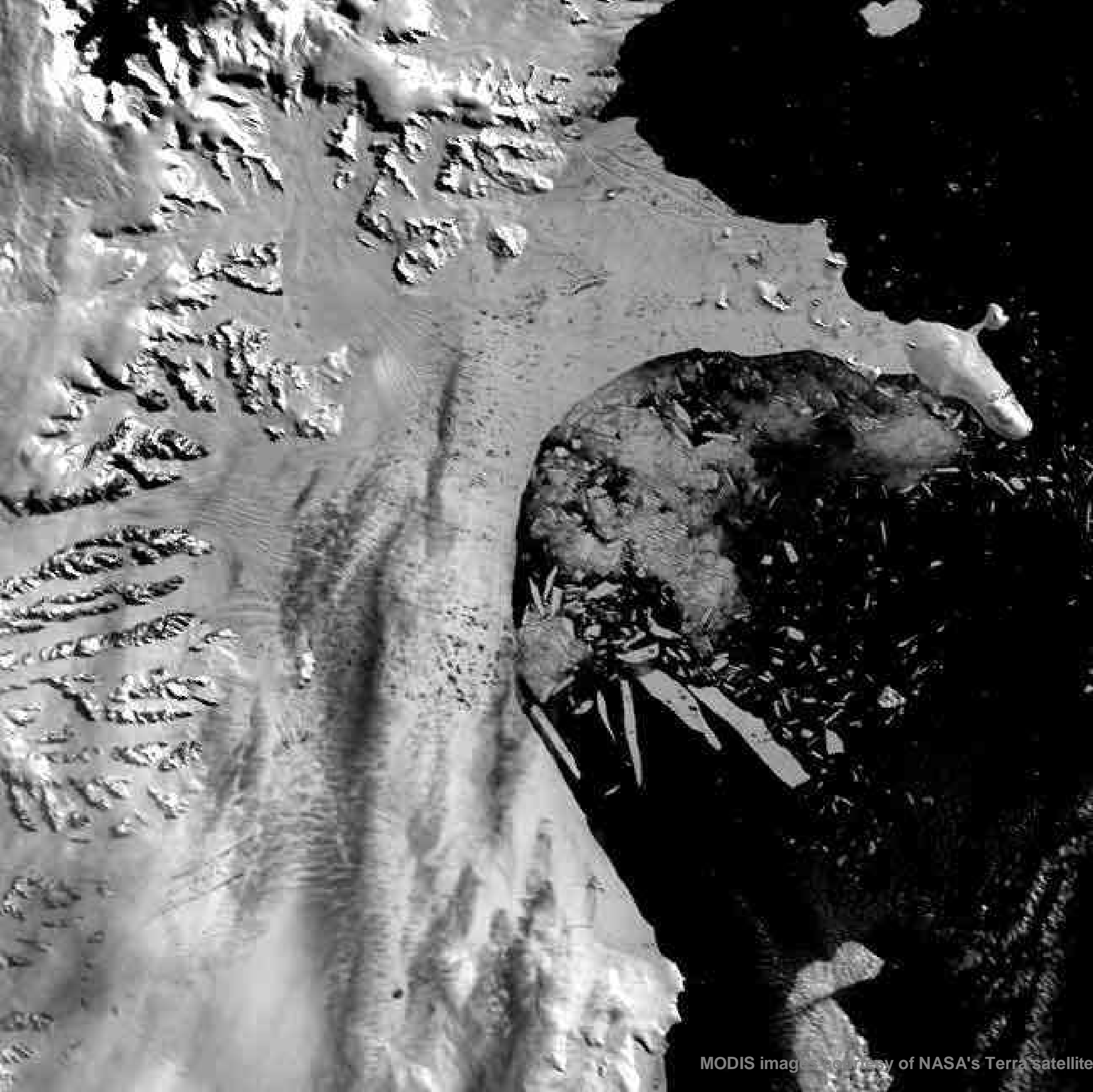
MODIS images courtesy of NASA's Terra satellite

**Larsen Ice Shelf**  
**January 31, 2002**



MODIS images courtesy of NASA's Terra satellite

**Larsen Ice Shelf**  
**February 17, 2002**



MODIS images courtesy of NASA's Terra satellite

**Larsen Ice Shelf**  
**February 23, 2002**





MODIS images courtesy of NASA's Terra satellite

**Larsen Ice Shelf**  
**March 5, 2002**



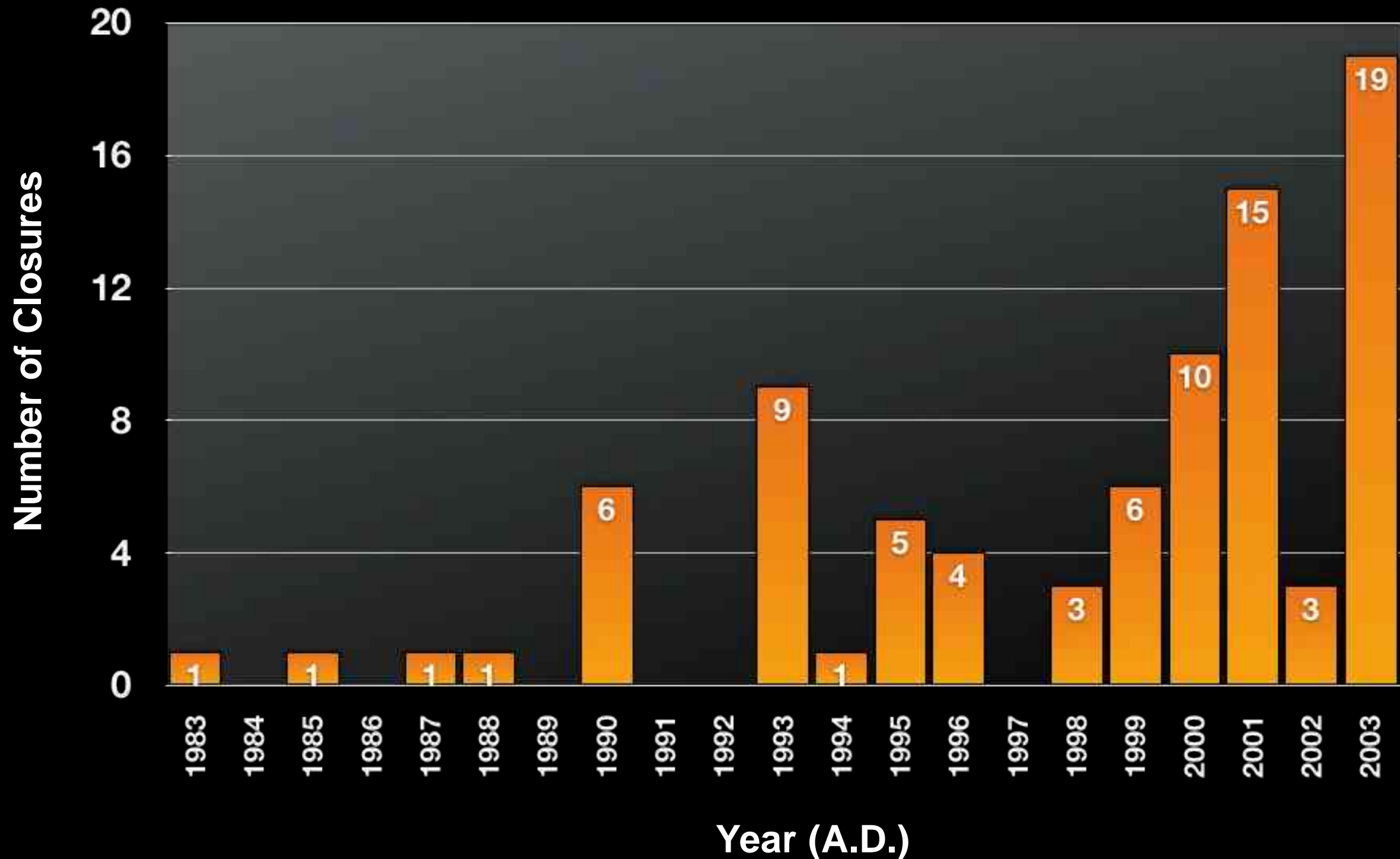
# Greenland Ice Sheet



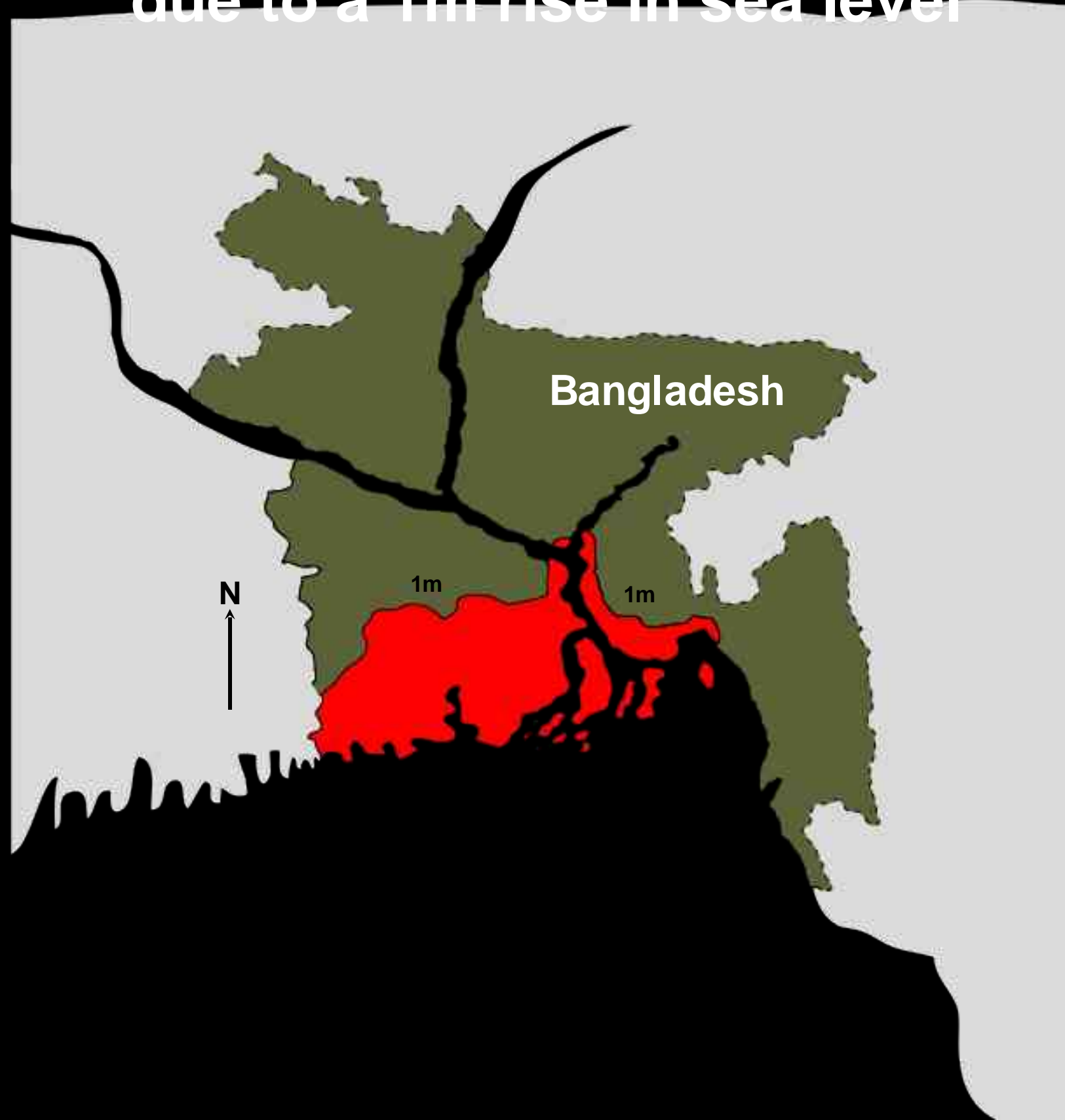




# Annual Closures of Thames Barrier

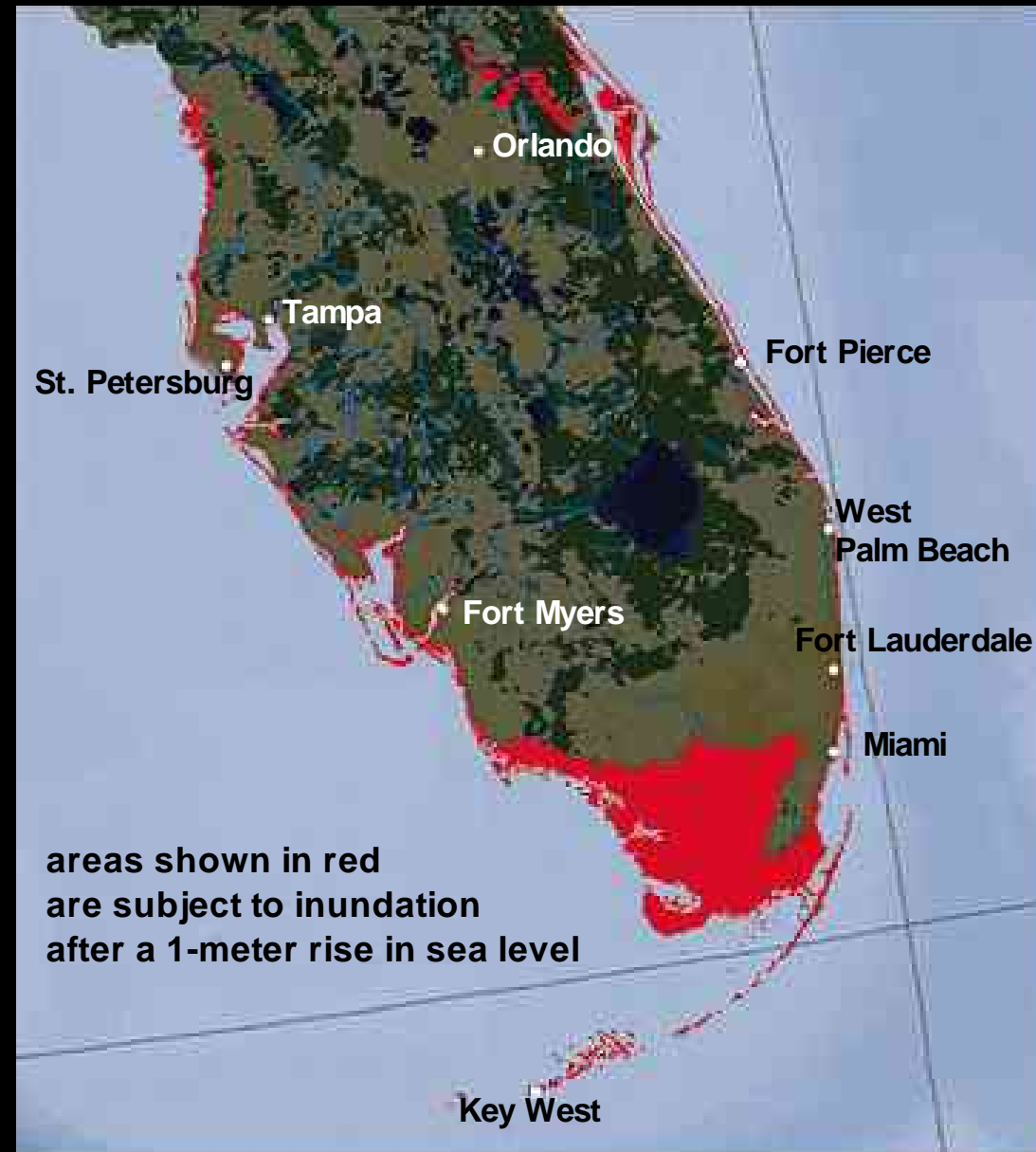


# Land at risk in Bangladesh due to a 1m rise in sea level





# South Florida Shoreline Change after a 1m rise in sea level





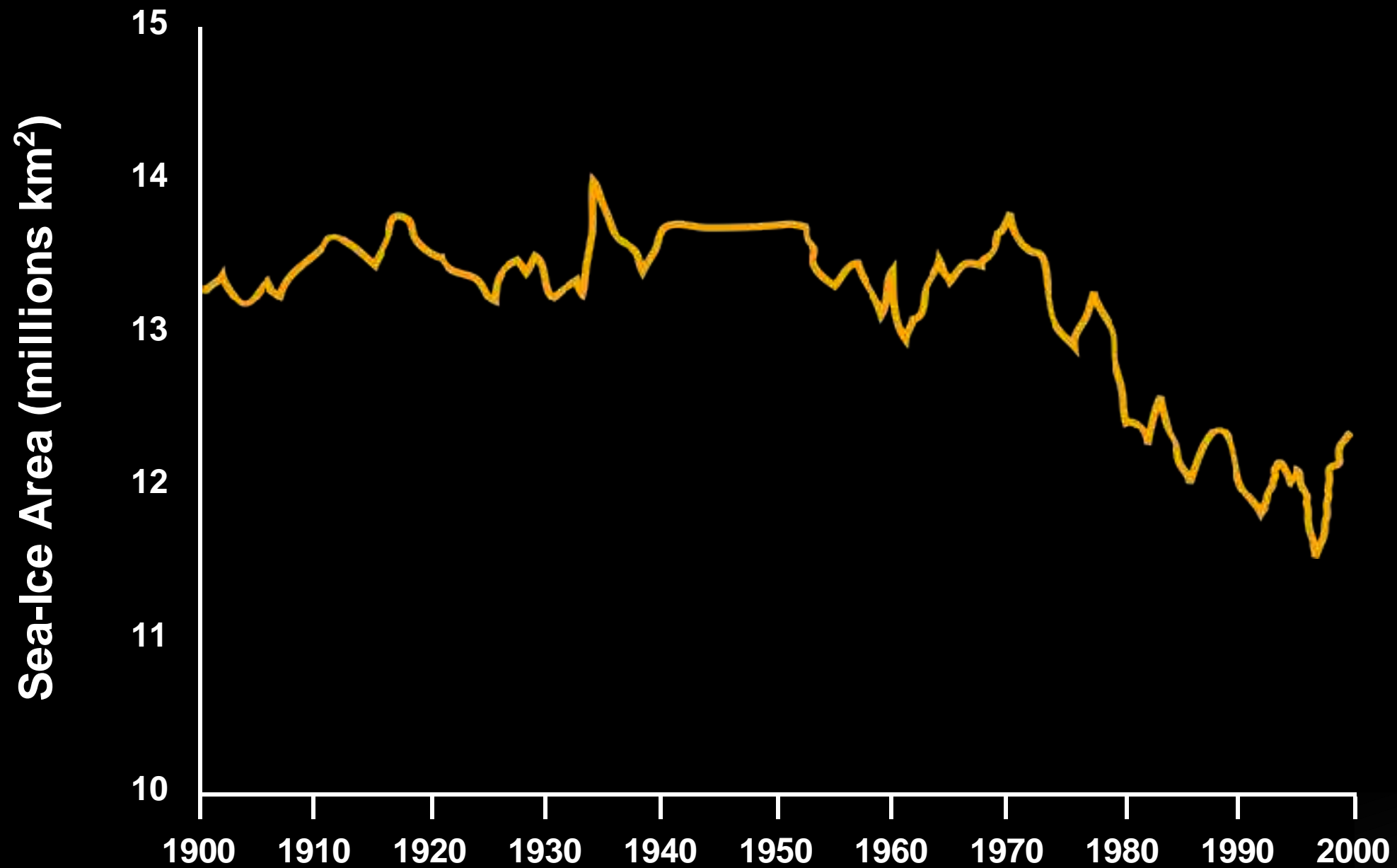








**Sea-ice extent has dropped by  
~1.5 million km<sup>2</sup> since 1970.**





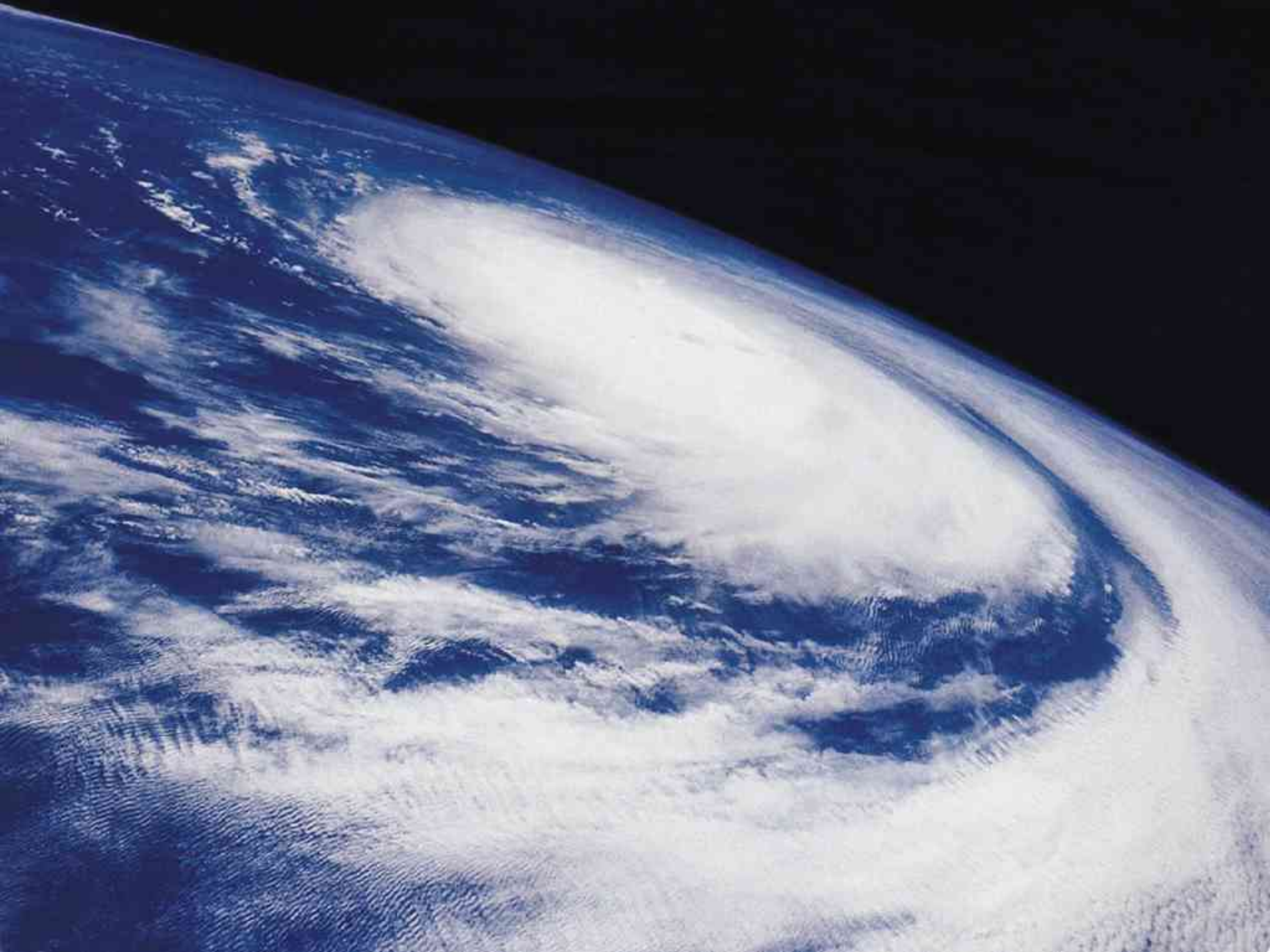






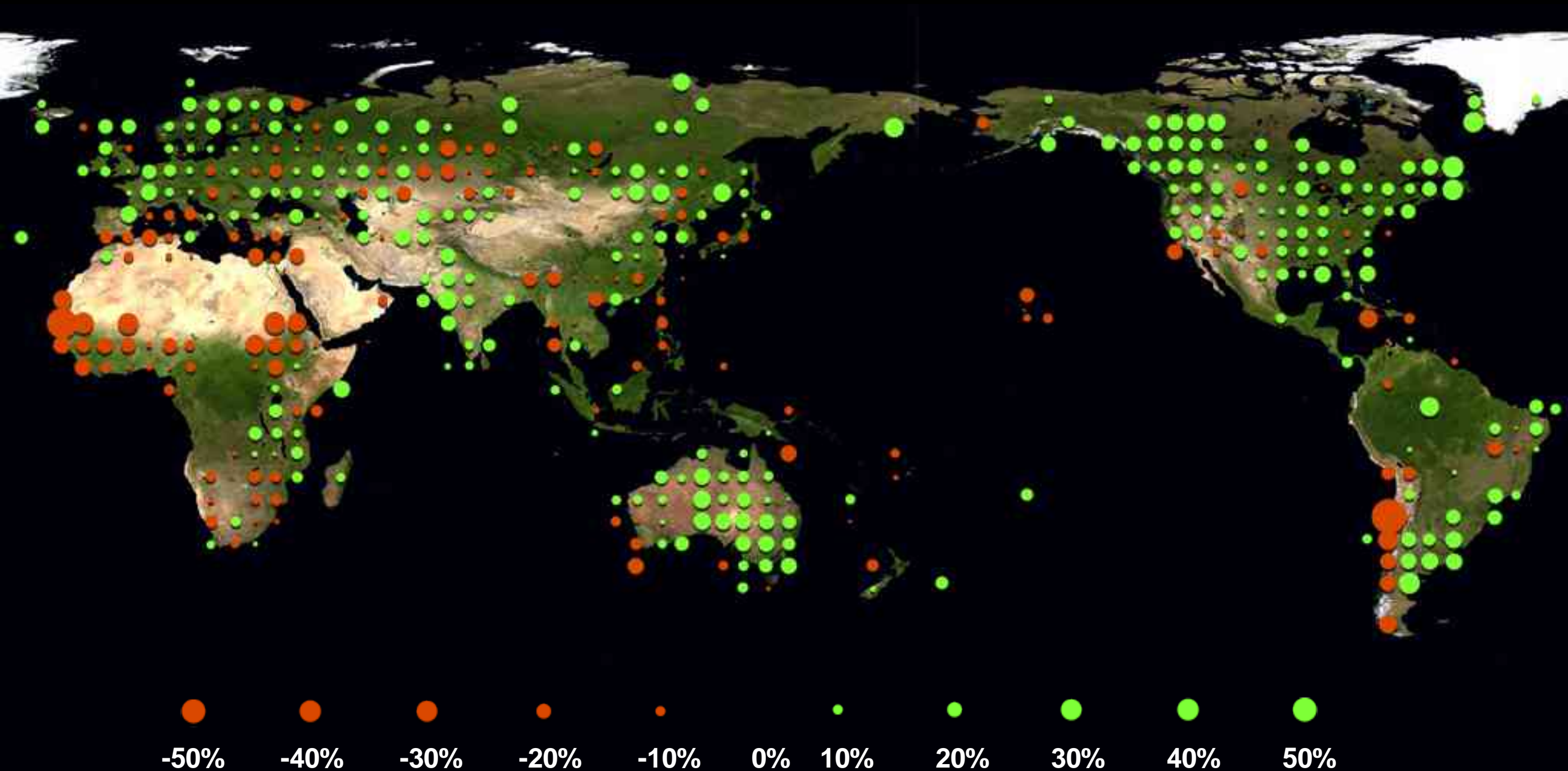






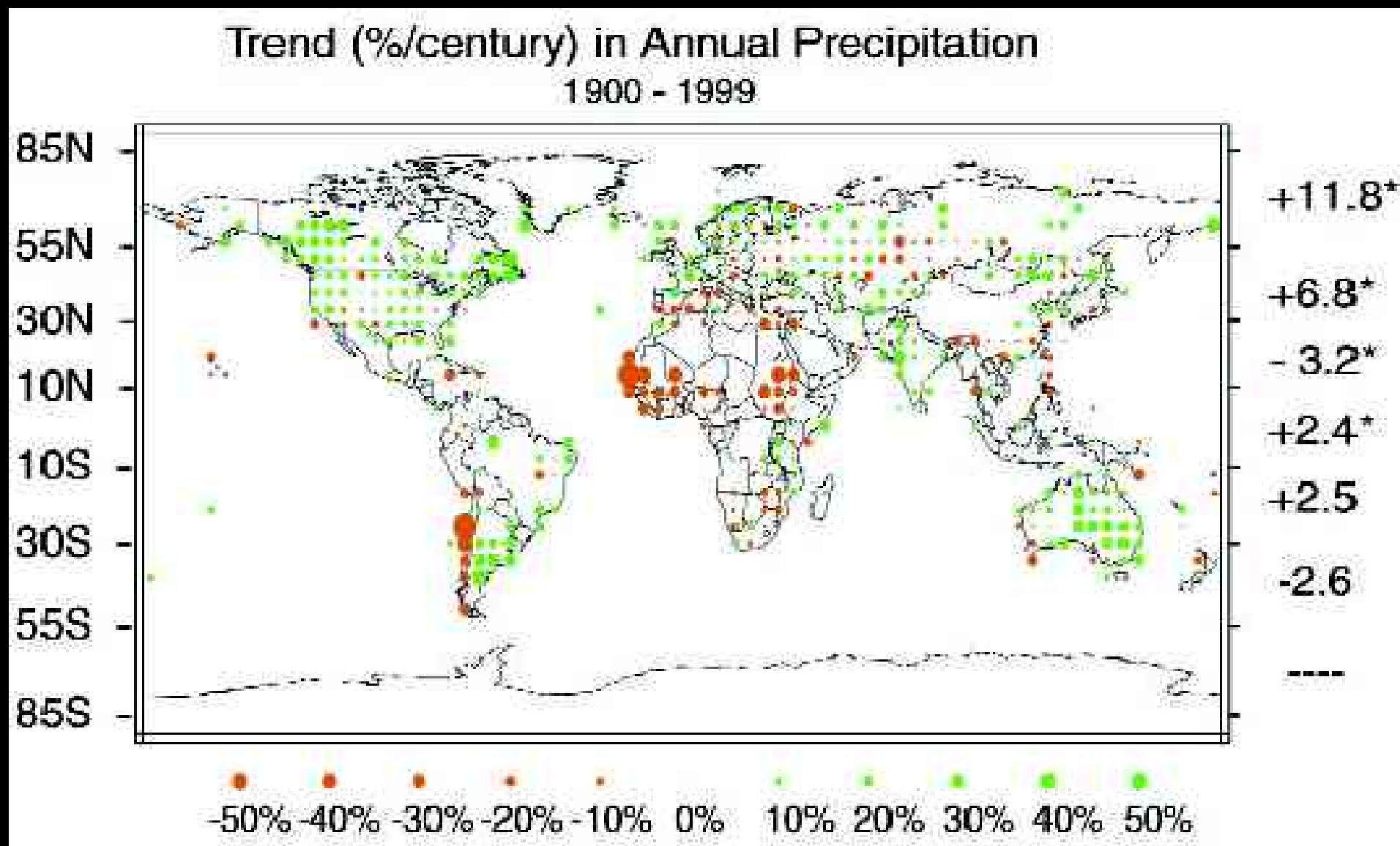


# Trend in Annual Precipitation



Effects of climate change are not uniform. Precipitation in the 20<sup>th</sup> century increased overall, as expected with a global warming, but decreased in some regions.



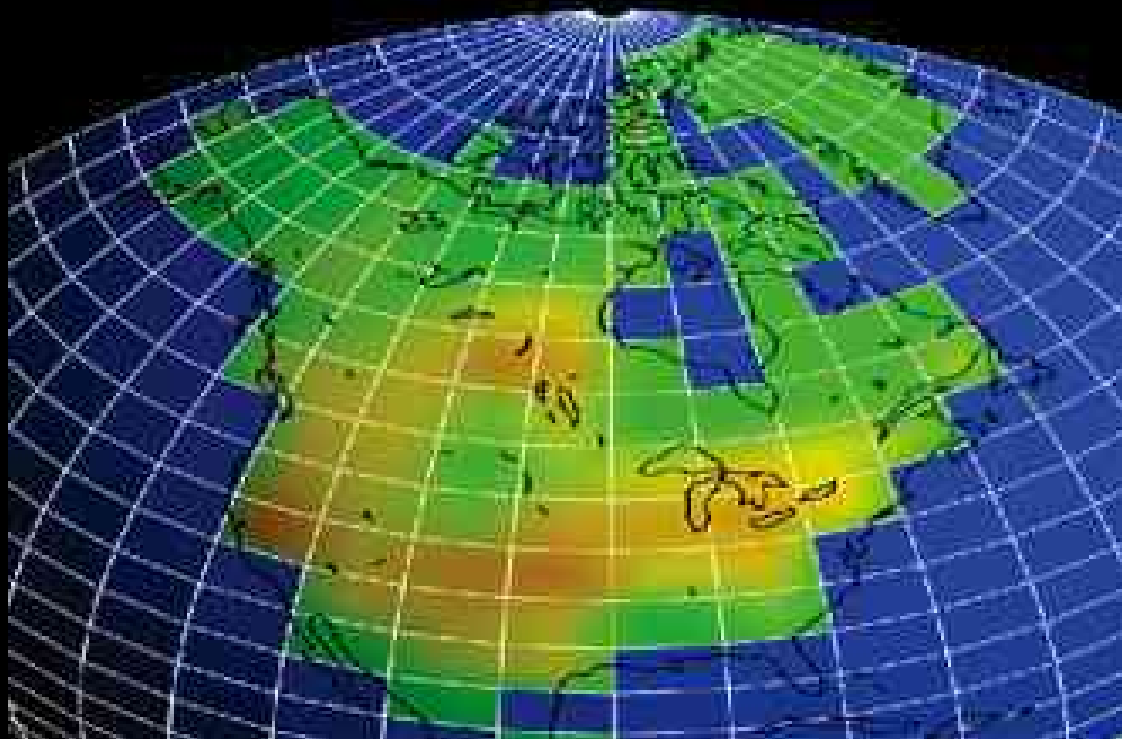


**Effects of climate change are not uniform. Precipitation in the 20<sup>th</sup> century increased overall, as expected with a global warming, but decreased in some regions.**

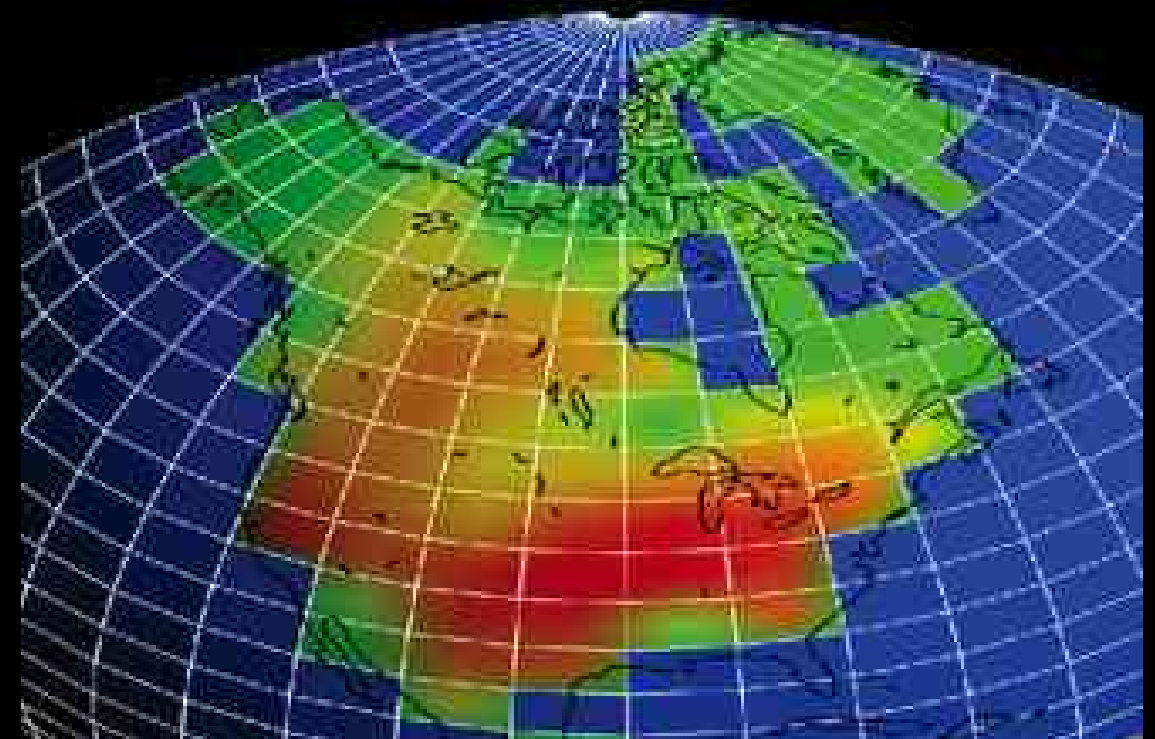
# Percent Reduction in June-August Soil Moisture



**Soil moisture reduction  
with doubling of CO<sub>2</sub>**



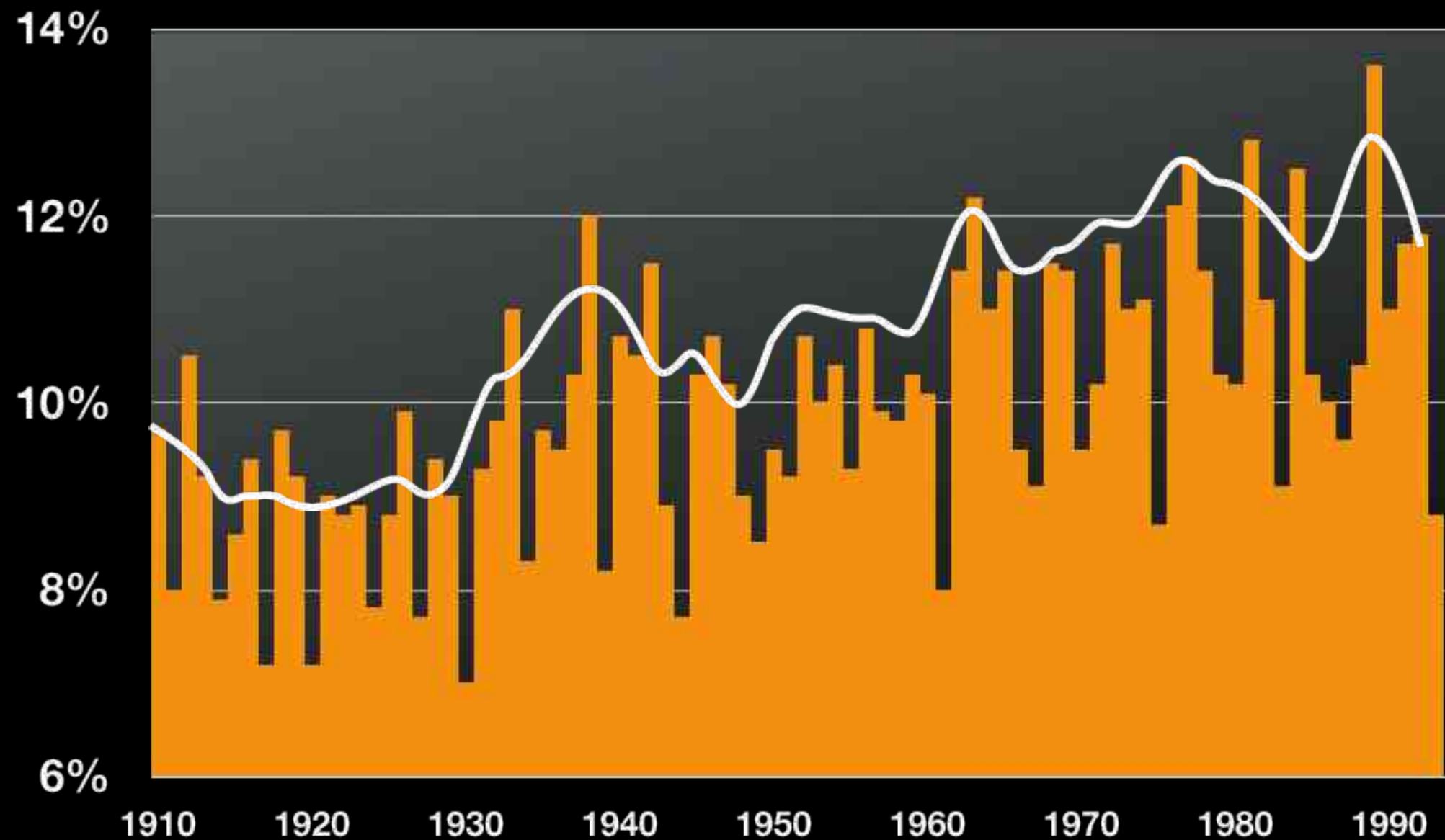
**Soil moisture reduction  
with quadrupling of CO<sub>2</sub>**



**Mid-continent soil-moisture reductions reach 50-60% in the 4xCO2 world**

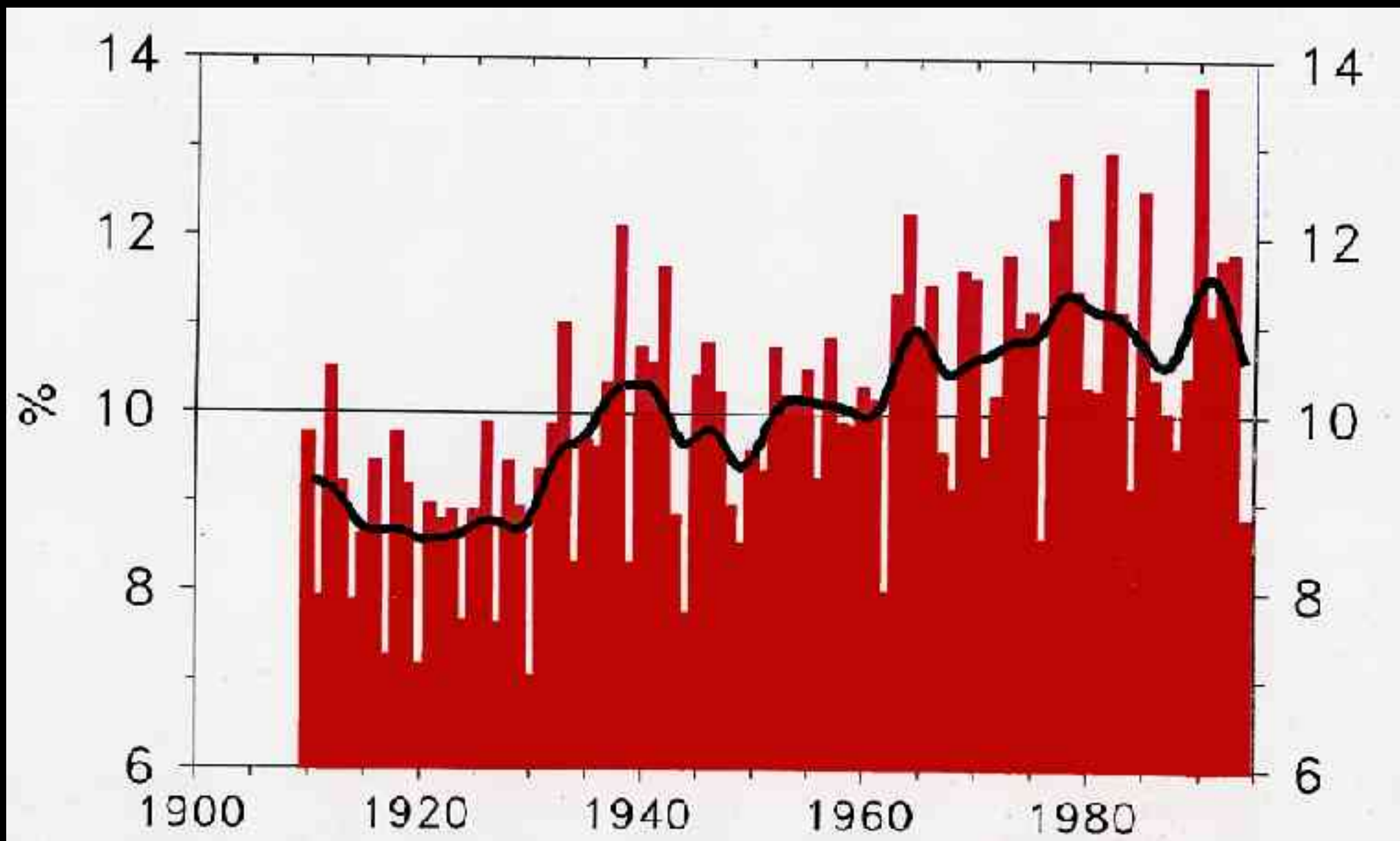
# Trend in U.S. Precipitation

**Percent of the Continental U.S.  
with Much Above Normal Proportion of Total Annual Precipitation From 1-day  
Extreme Events (more than 2 inches)**



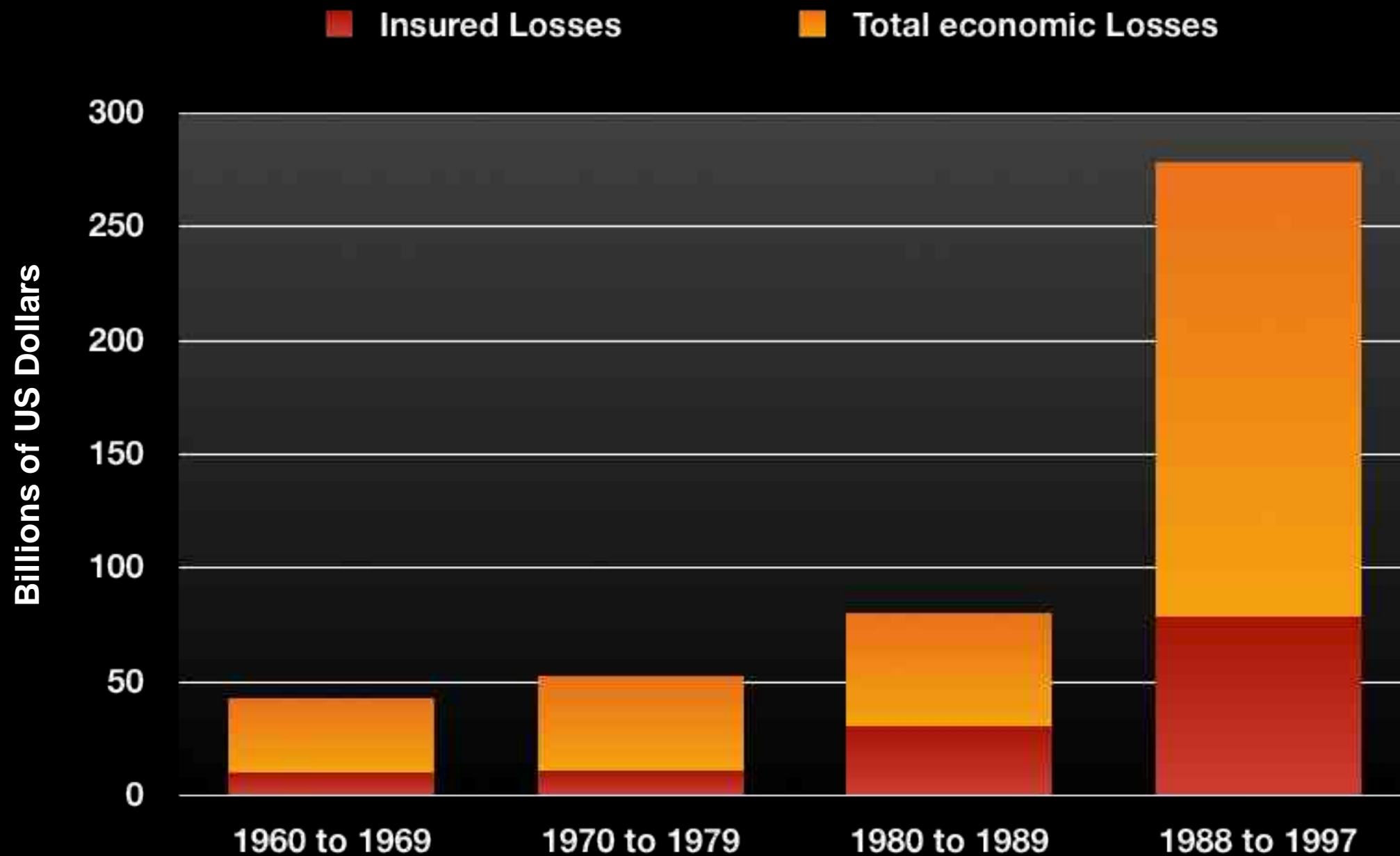


**Percent of the Continental U.S. with Much Above Normal Proportion of Total Annual Precipitation From 1-day Extreme Events (more than 2 inches)**

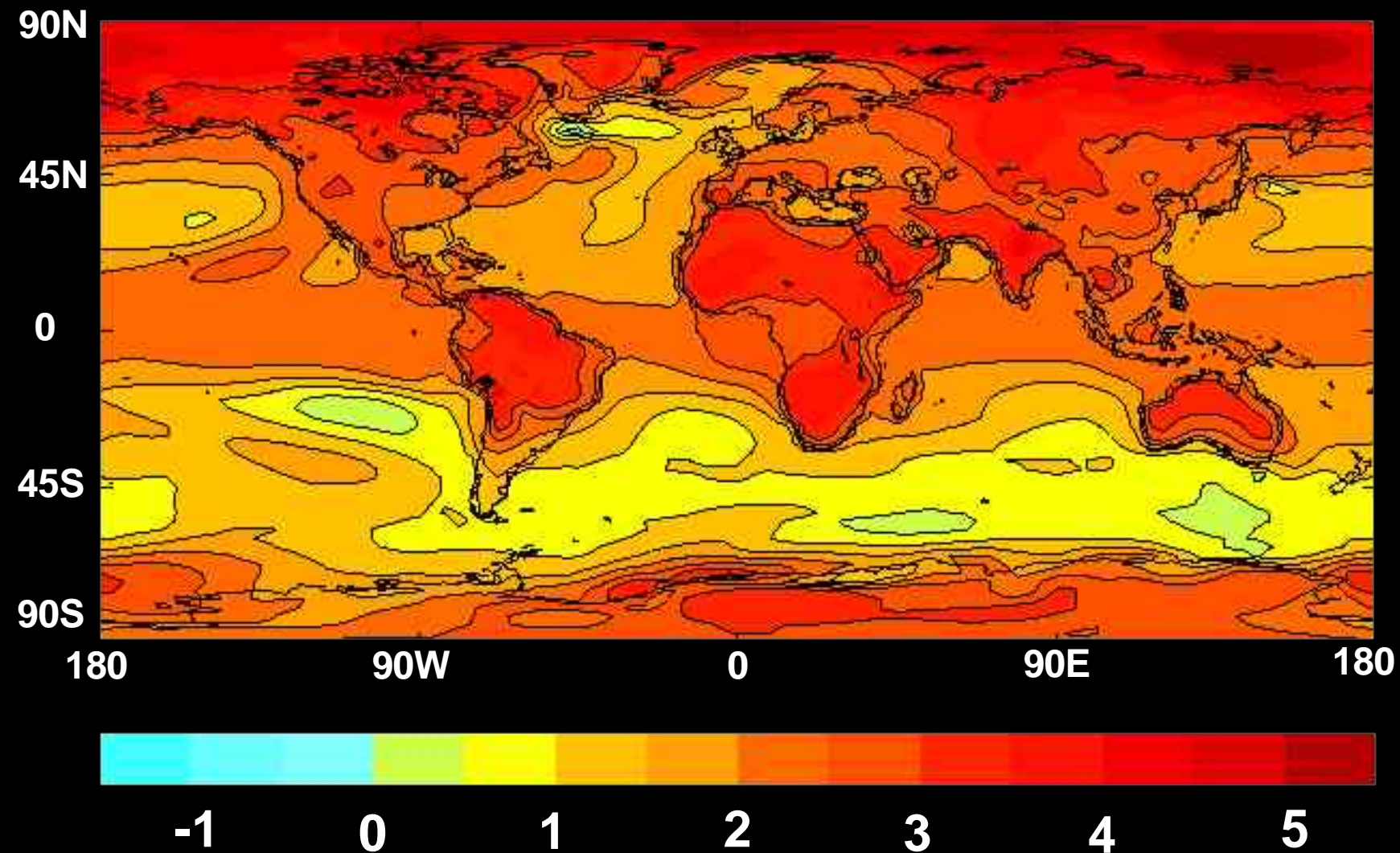


# Great Weather and Flood Catastrophes

## Losses in Billions of US Dollars



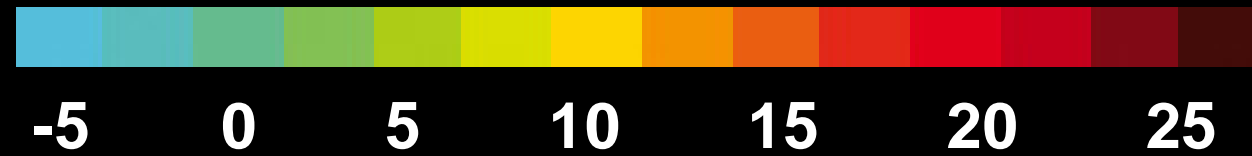
# Continental Warming Far Exceeds the Global Average



Mid-21<sup>st</sup>-century Warming Under BAU  
HADCM2 GHG ensemble (2041-70)–(1961-90) Annual Mean Temperature (°C)

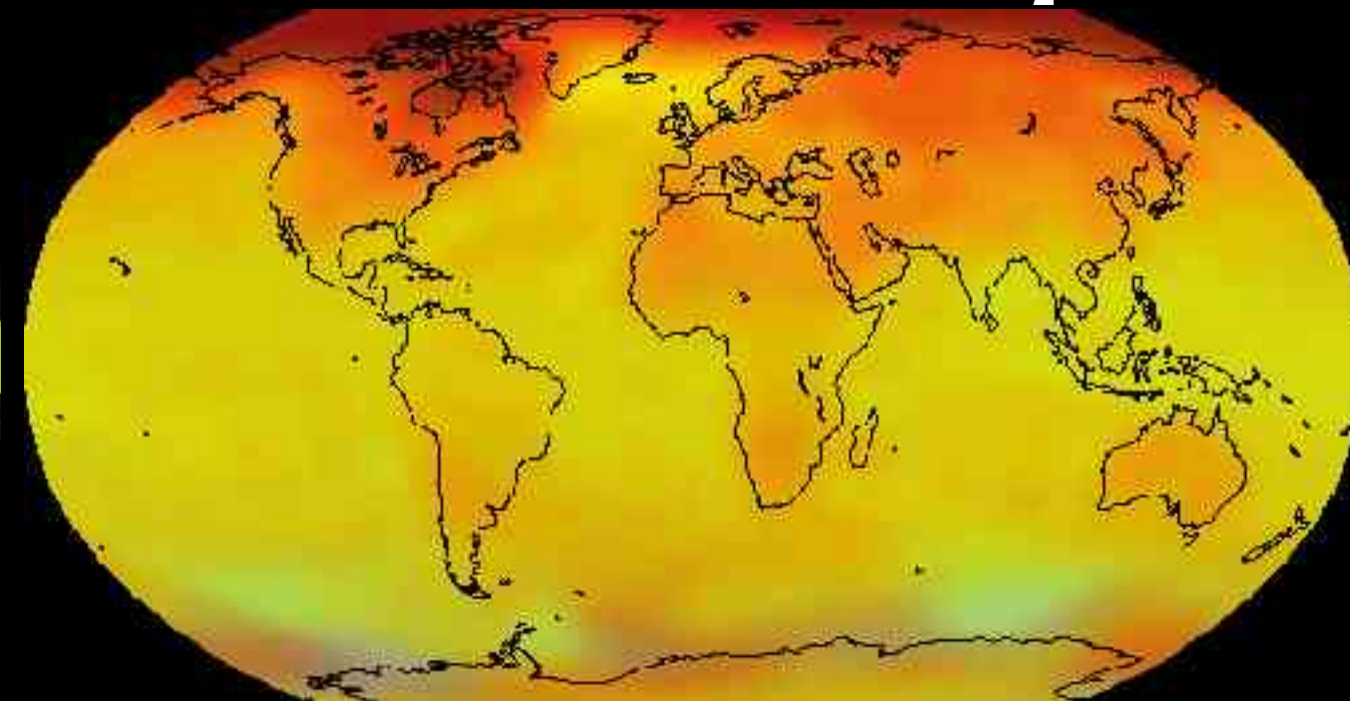
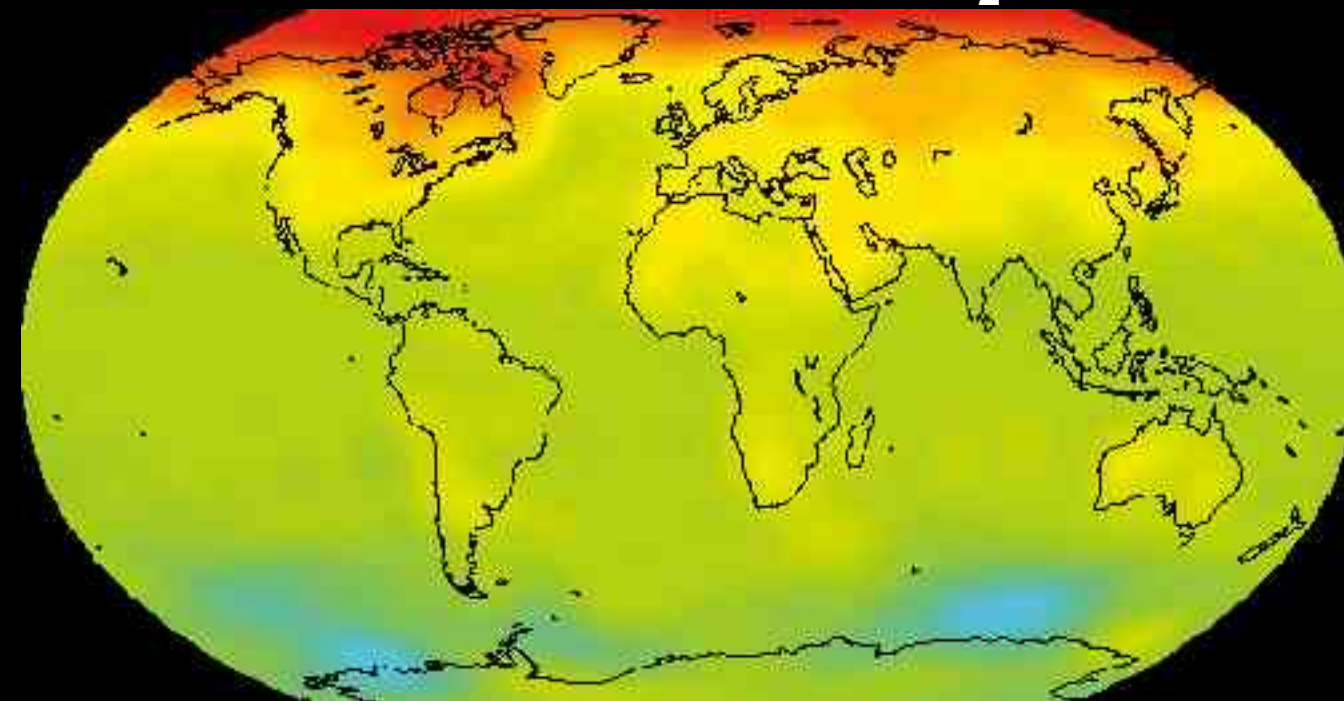


# Surface Air Warming (°F)



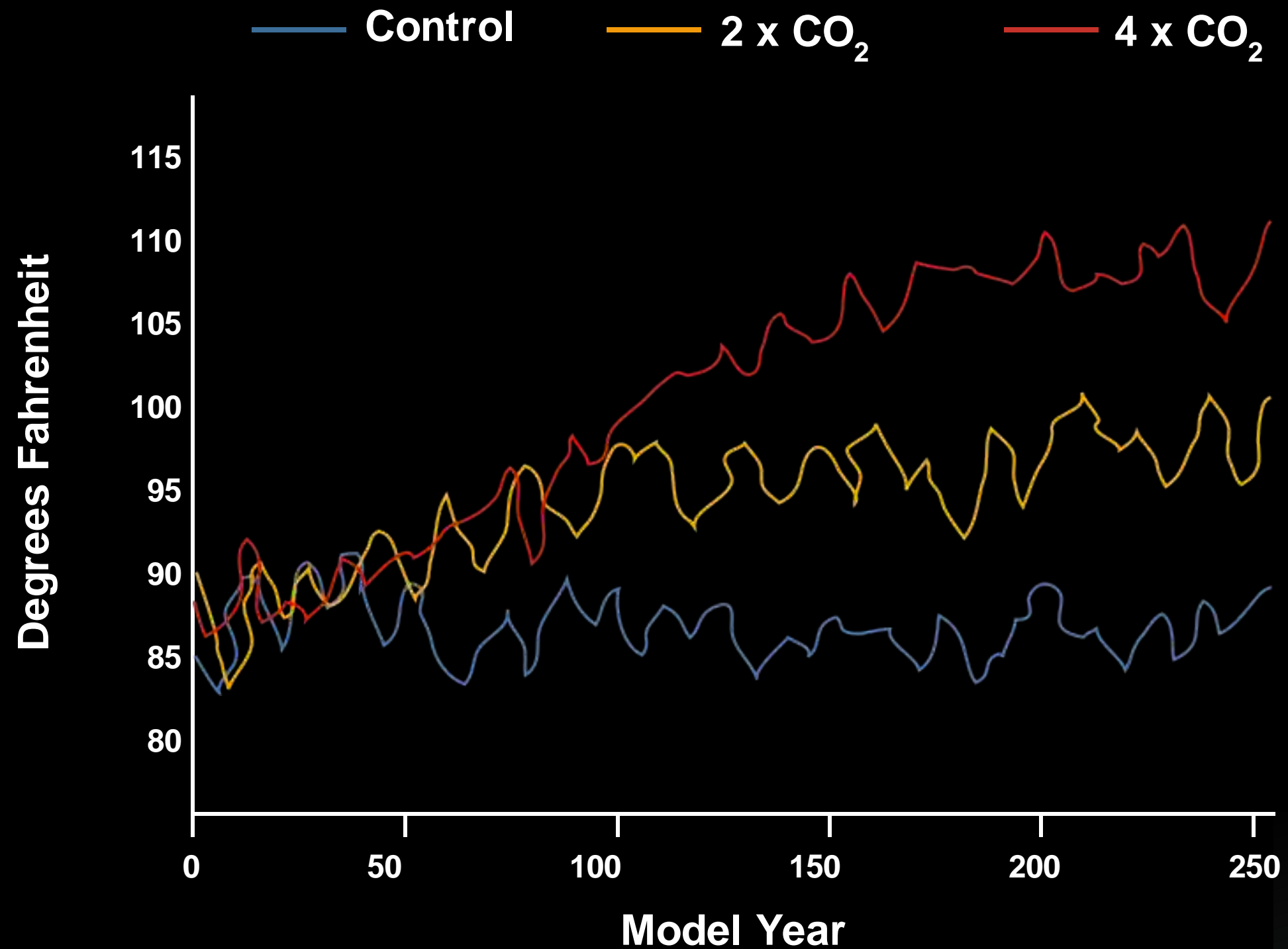
**Temperature increases  
with doubling of CO<sub>2</sub>**

**Temperature increases  
with quadrupling of CO<sub>2</sub>**



**Northern hemisphere mid-continent average warming in the 4xCO<sub>2</sub> world is 15-25°F!**

# July Heat Index for Southwestern US



**We are witnessing a collision  
between our civilization and the earth.**

**3 factors are  
causing this collision:**



# **1.The Population Explosion**















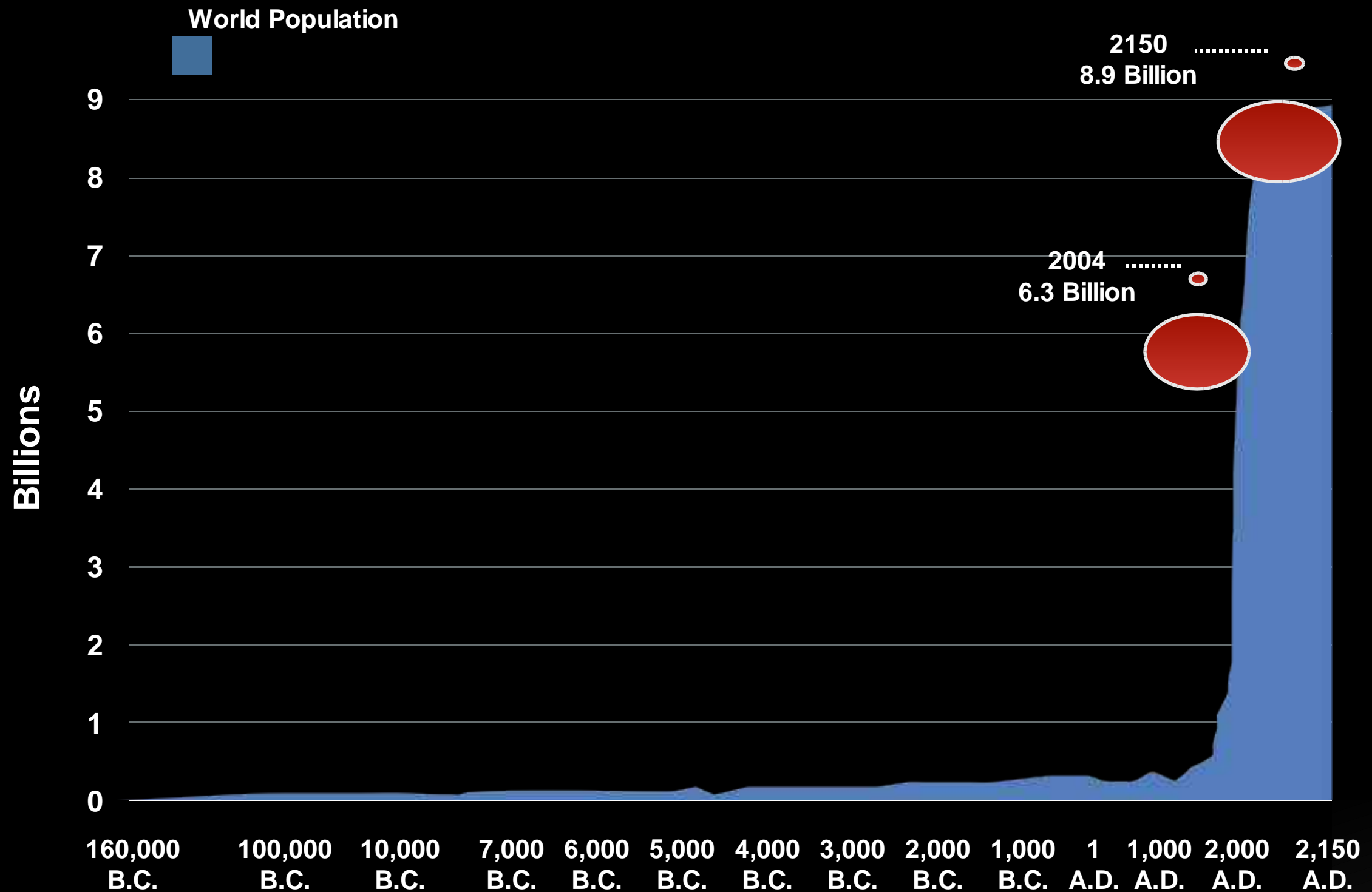




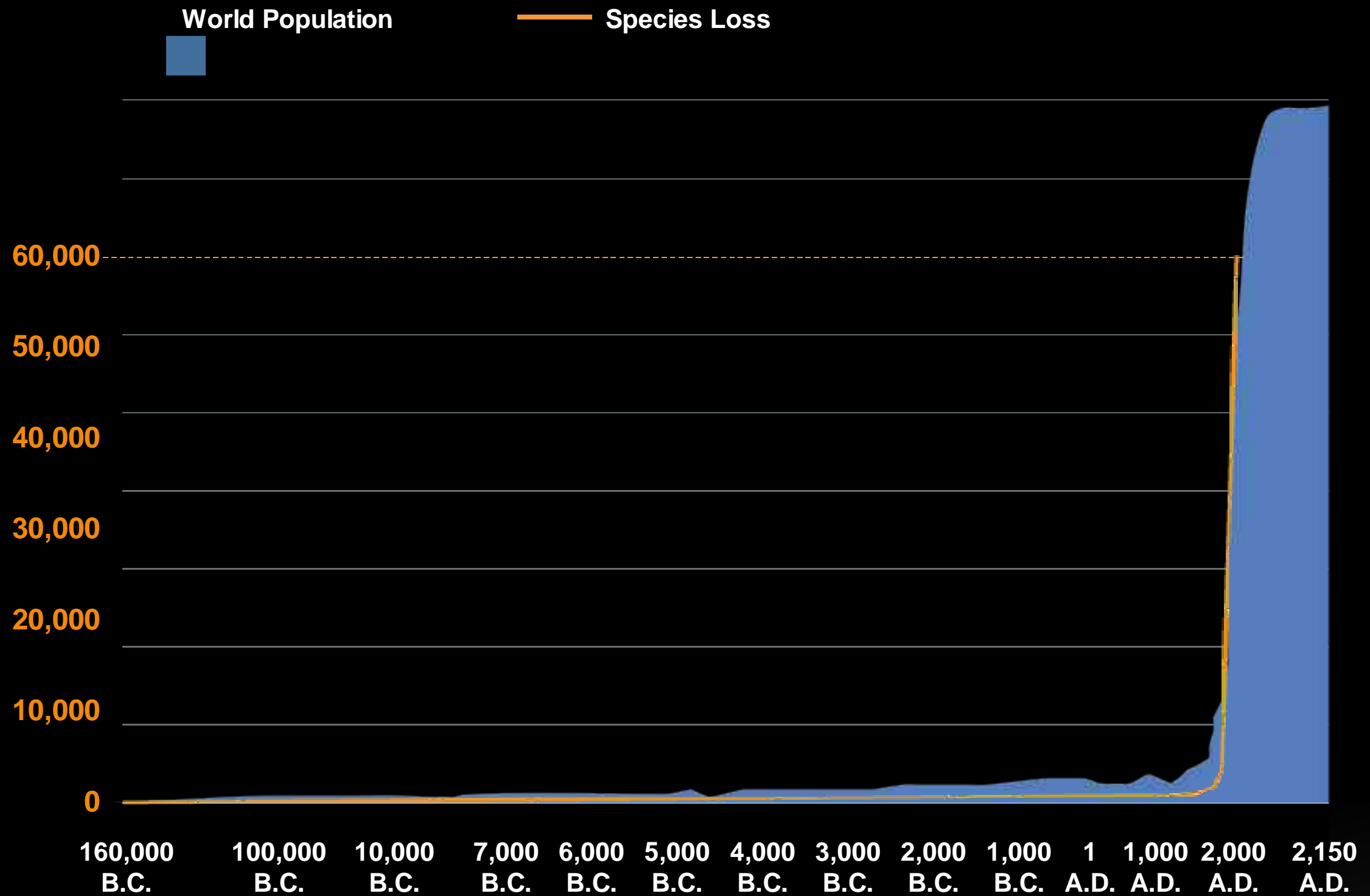




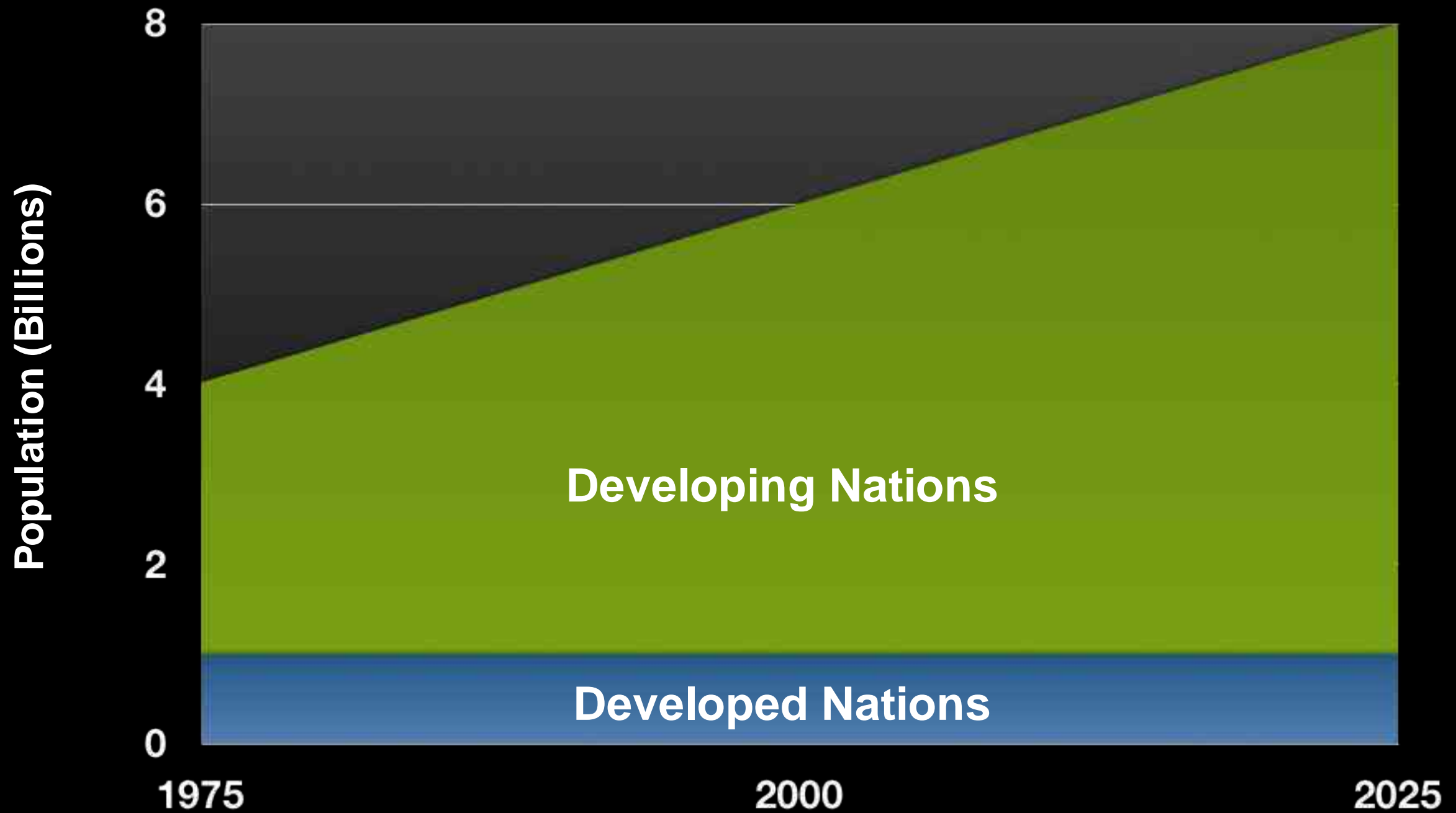
# Population Growth Throughout History



# Species Loss

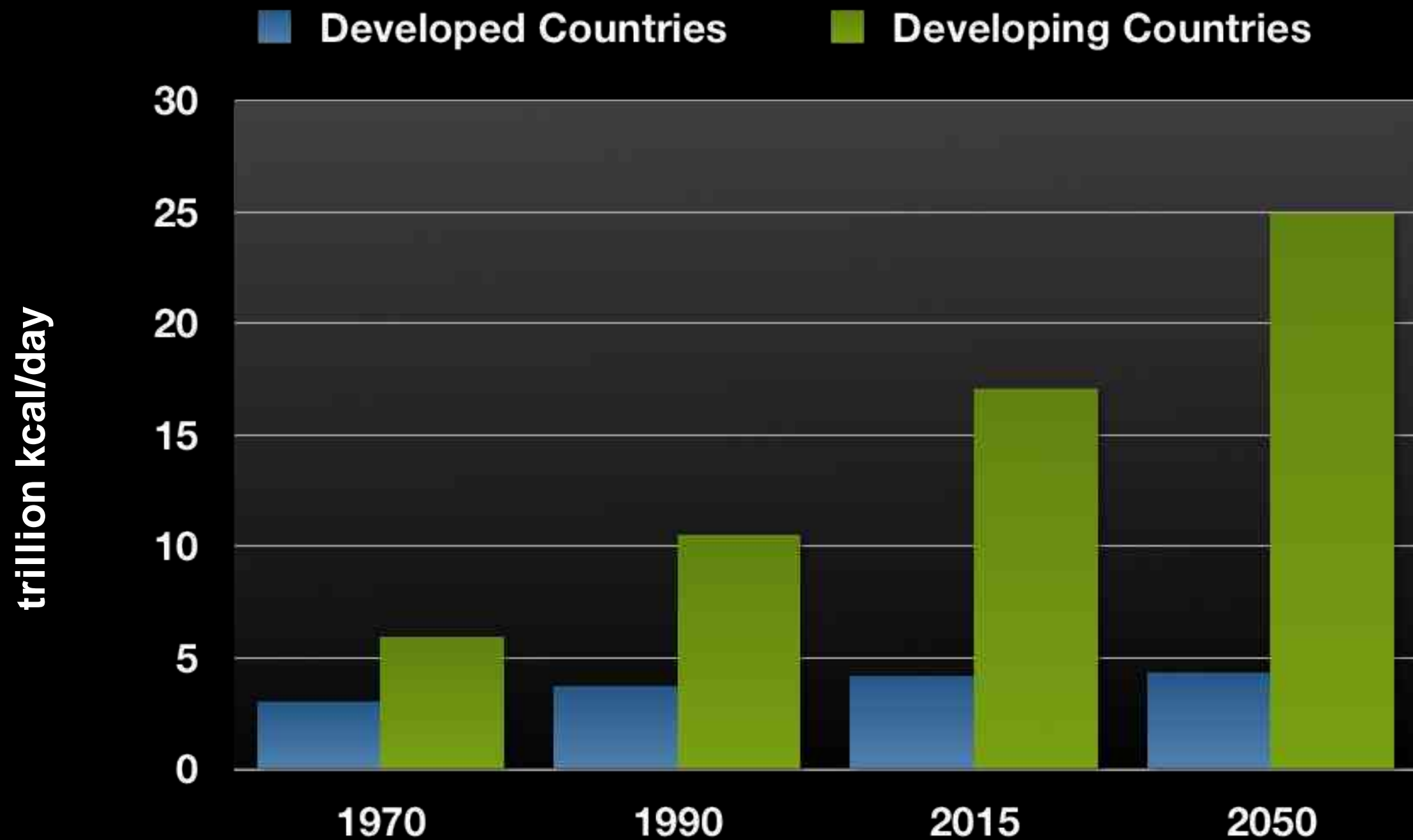


# Global Population

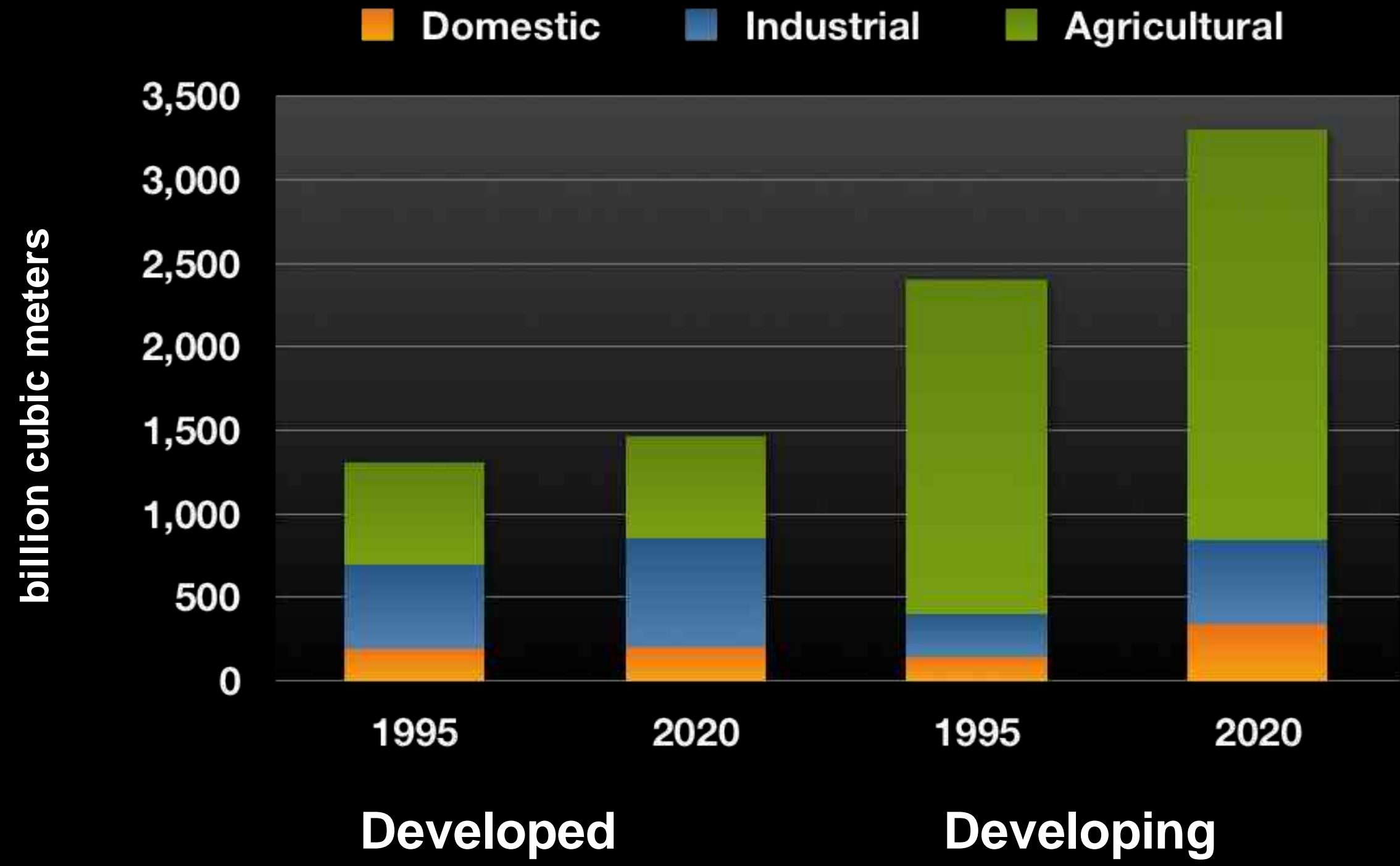




# Food Demand

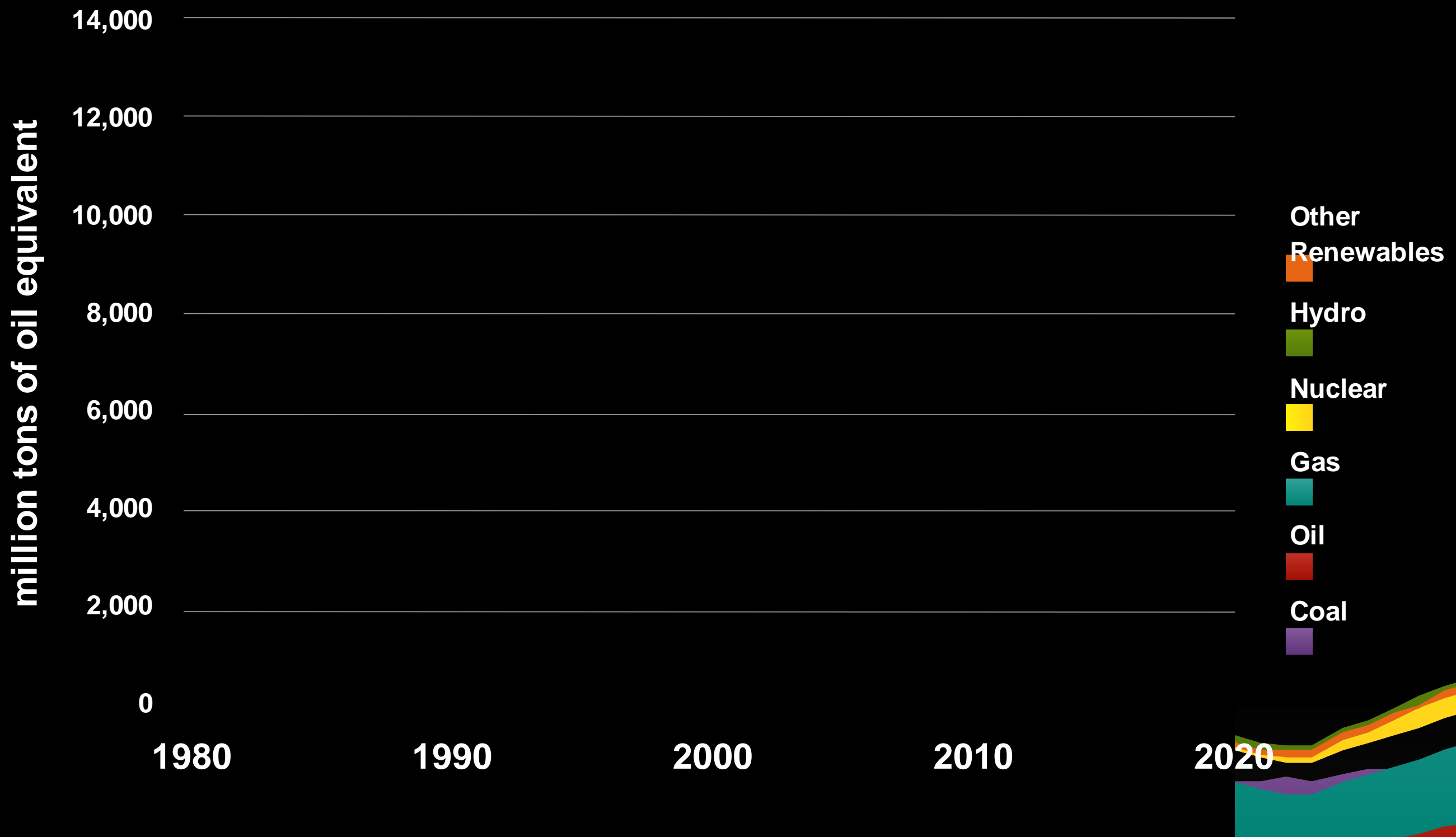


# Growing Demand for Water



# Global Energy Production by Sector

## Past Estimates and Future Projections 1980–2020



































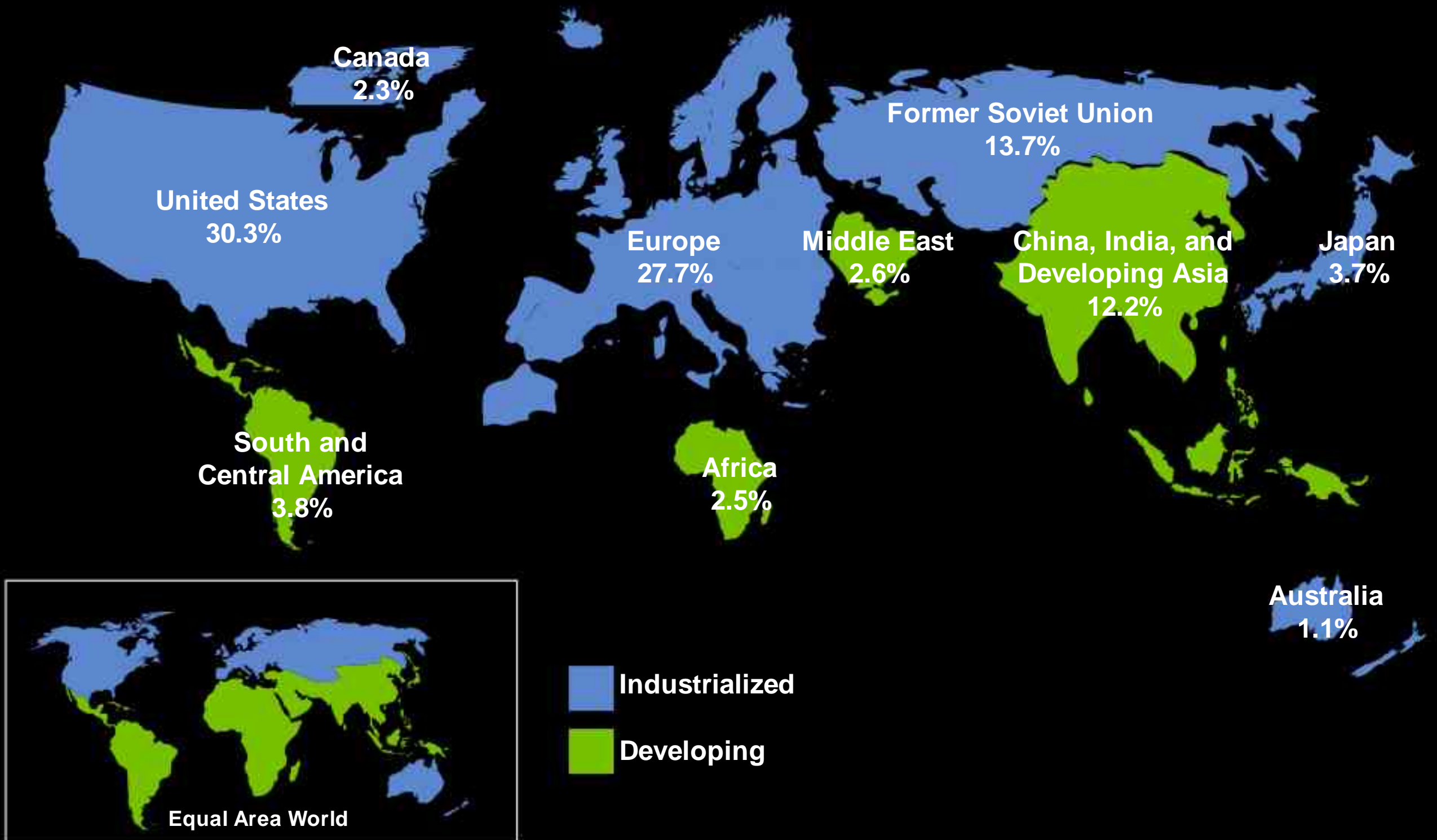






# Contributions to Global Warming

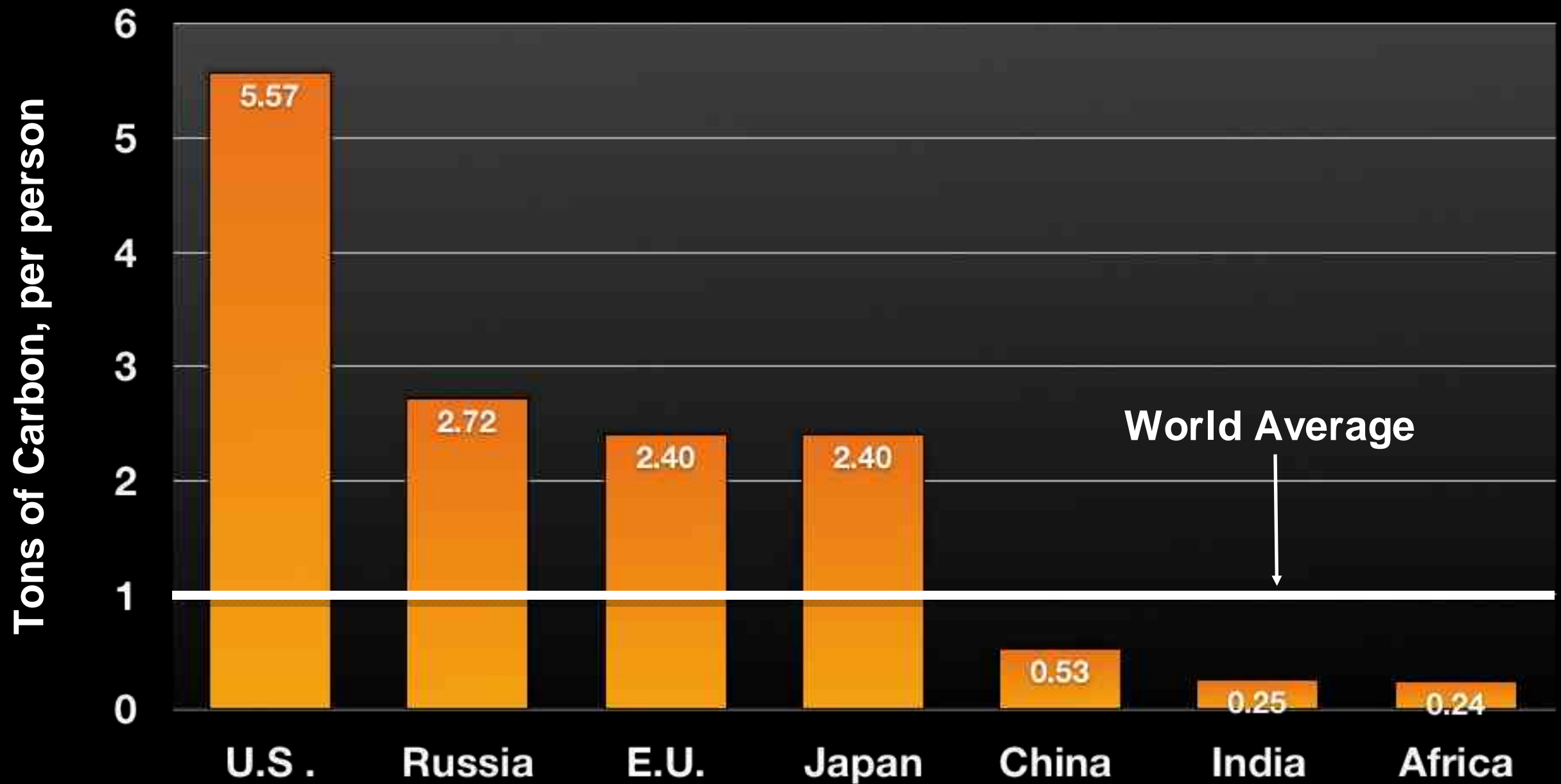
Areas are proportional to historic carbon dioxide emissions from fossil fuel combustion, 1900-1999





# Carbon Emissions Per Person

1999

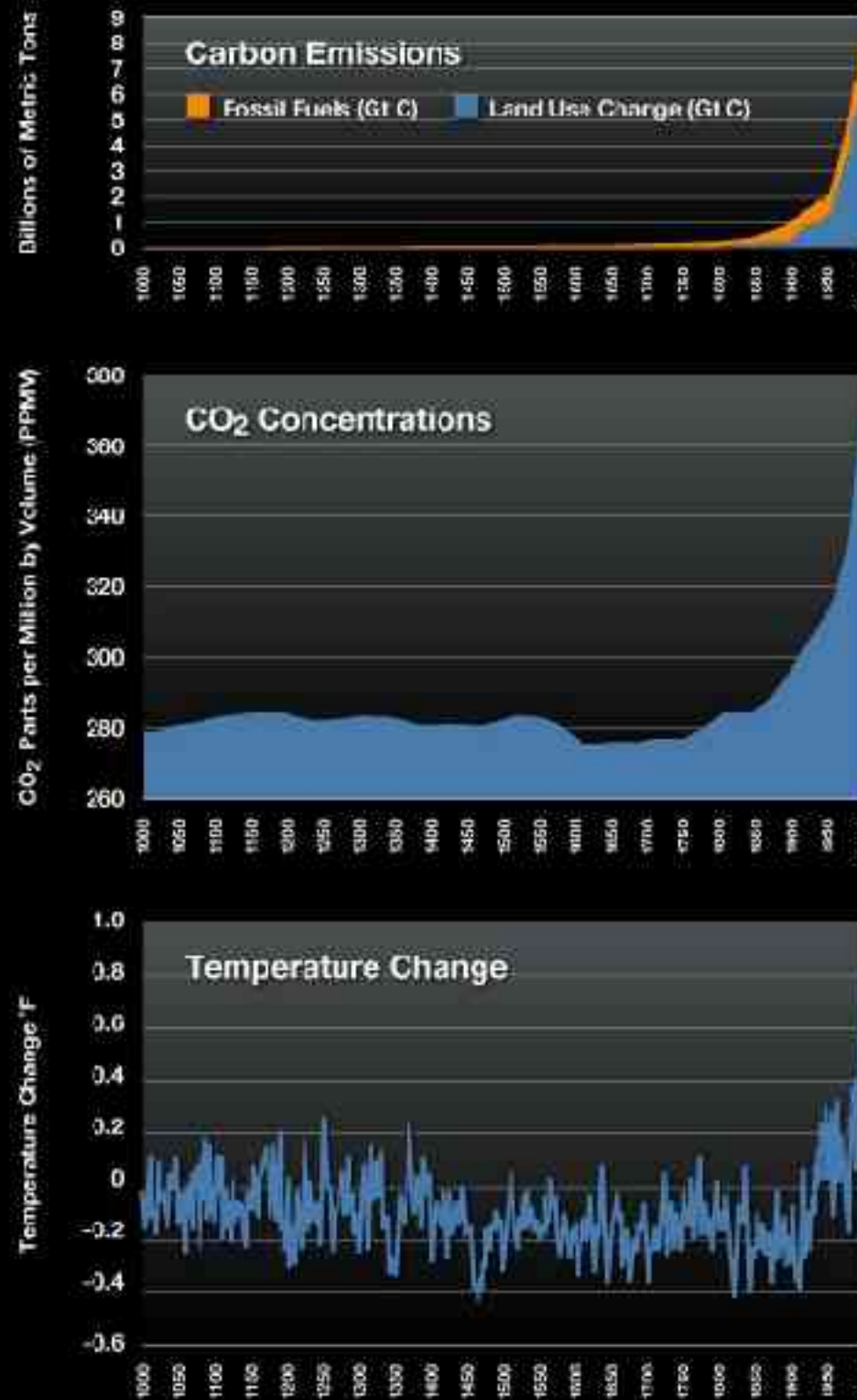


Sources: World Resources Institute

Underlying data source: U.S. DOE, Energy Information Administration, International Energy Annual 1999.

Notes: Shows carbon emissions associated with fossil fuel combustion.

# 1000 Years of Carbon Emissions and Global Warming





**1.The Population Explosion**

**2.The Scientific and  
Technological Revolution**













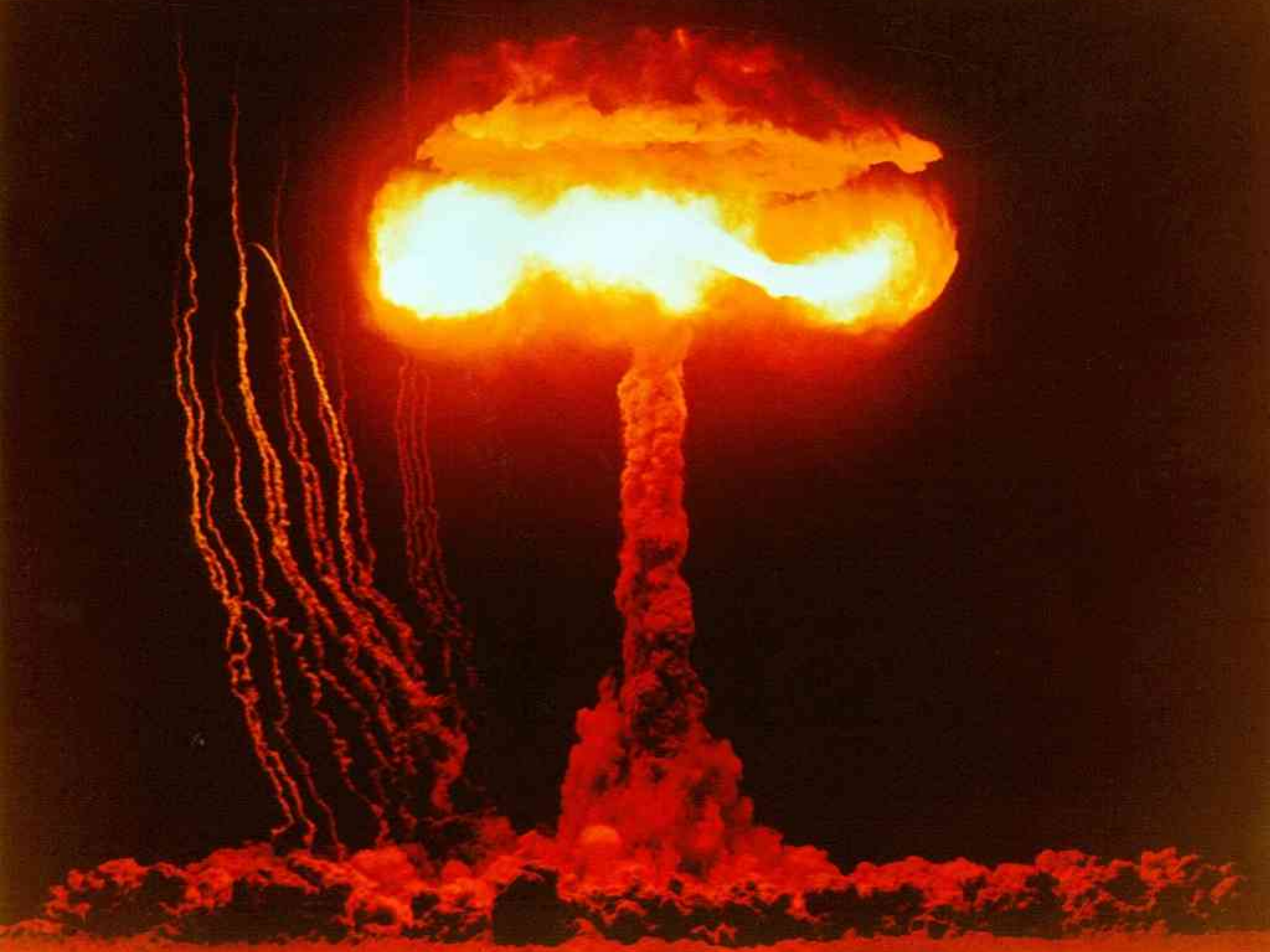


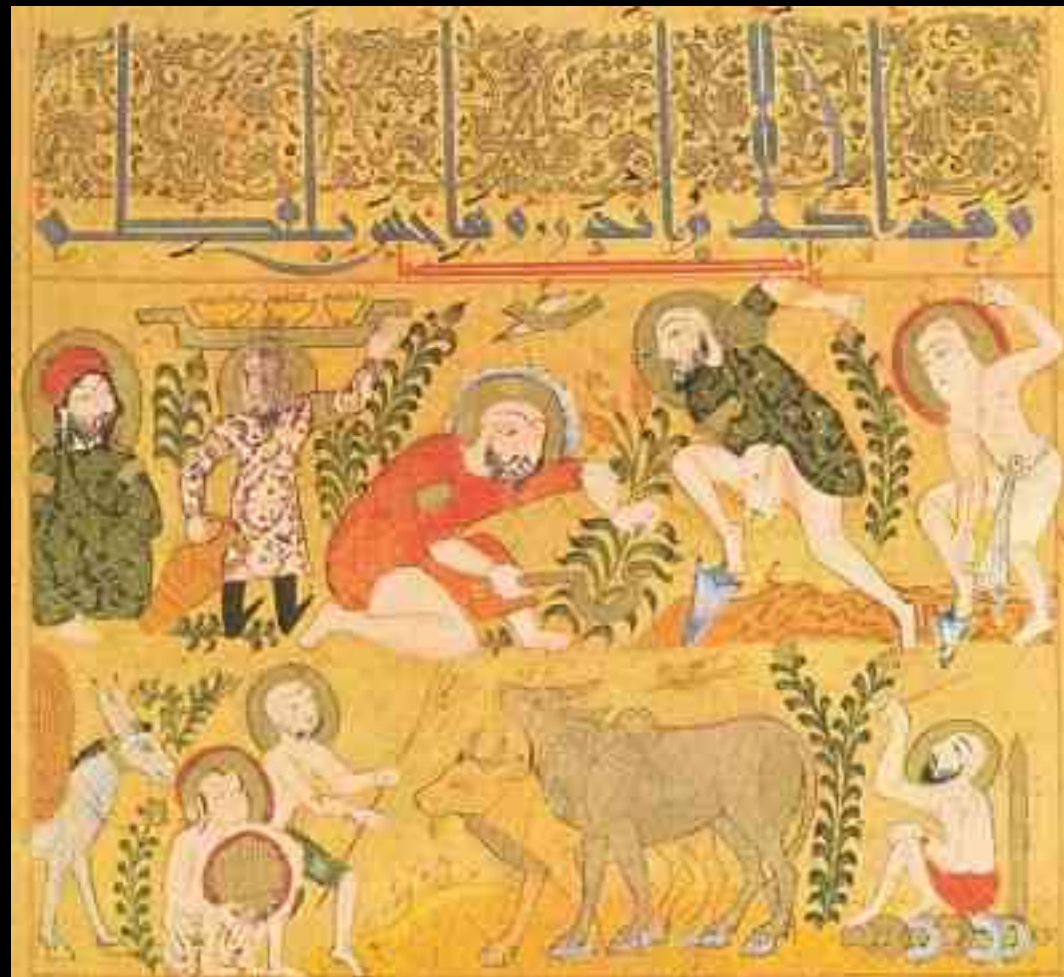




















































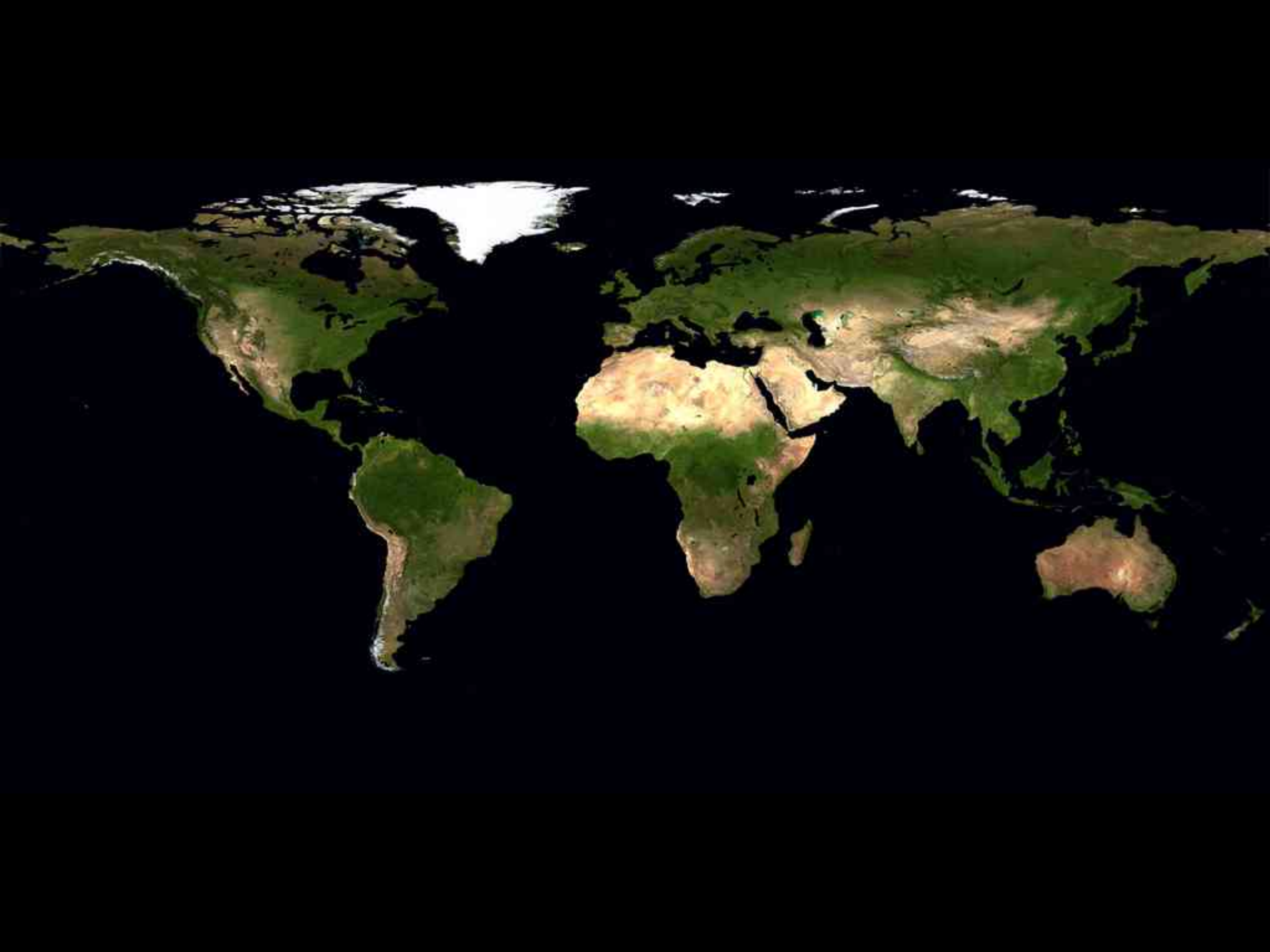




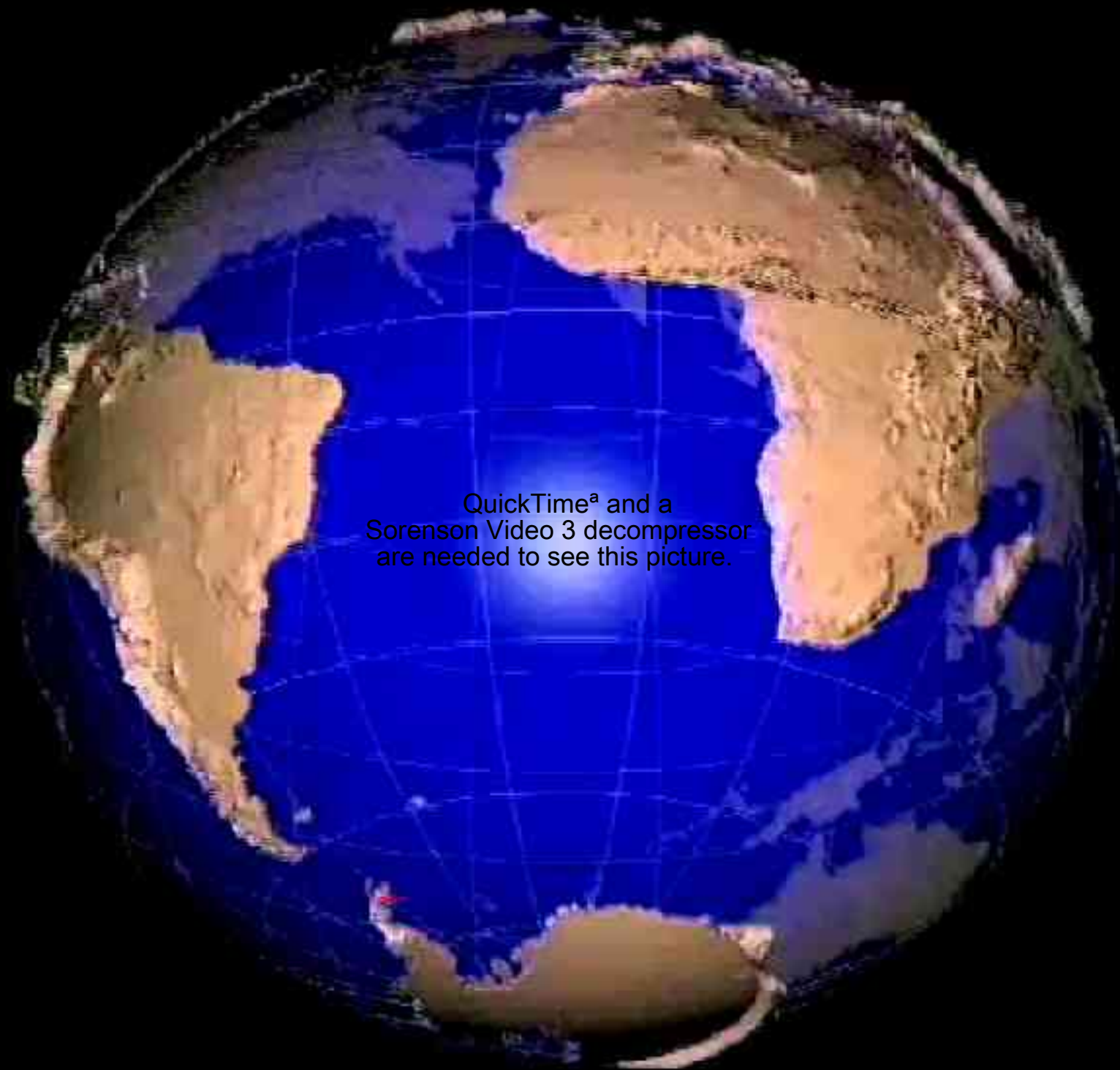
**1.The Population Explosion**

**2.The Scientific and  
Technological Revolution**

**3.Our Way of Thinking**







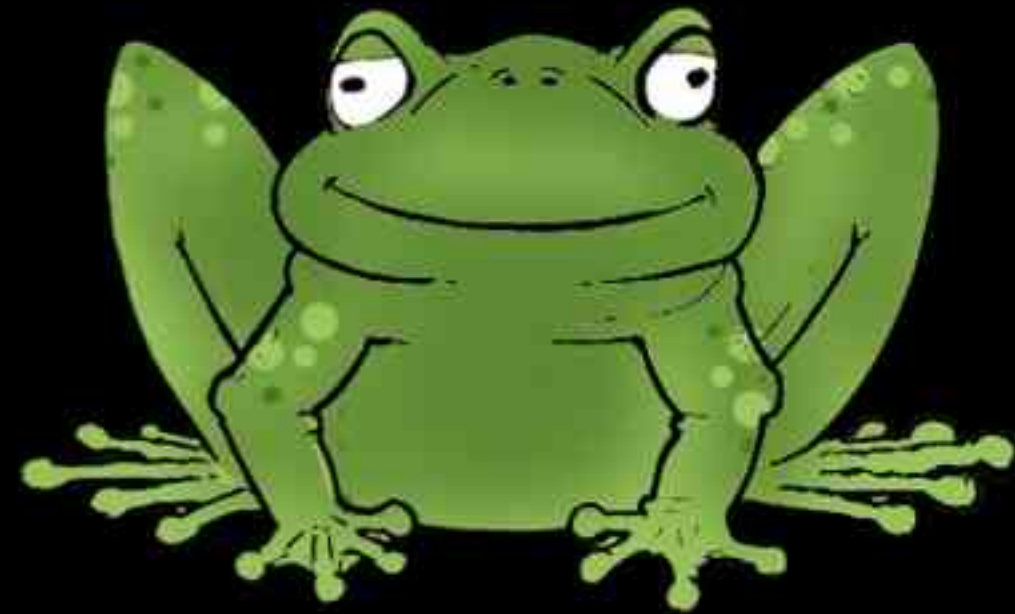
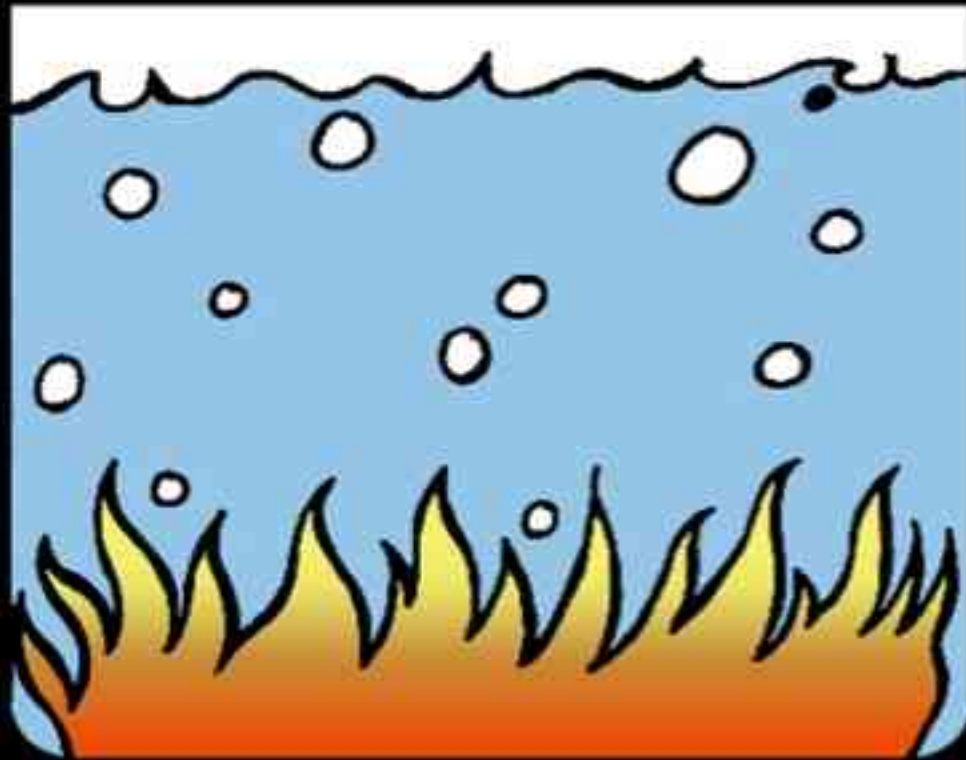
QuickTime<sup>a</sup> and a  
Sorenson Video 3 decompressor  
are needed to see this picture.

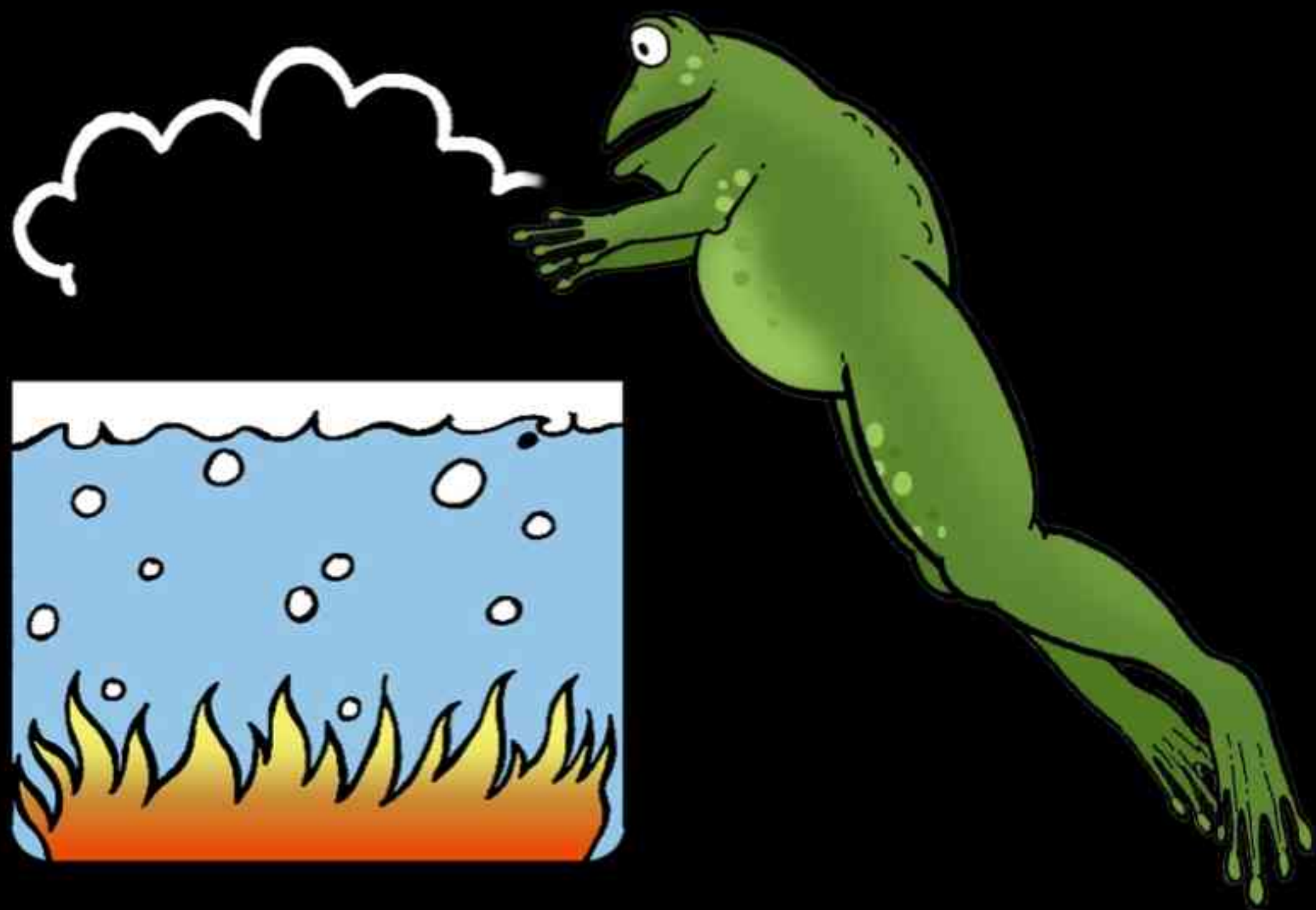
**What gets us into trouble  
is not what we don't know**

**It's what we know for sure  
that just ain't so**

**Yogi Berra**

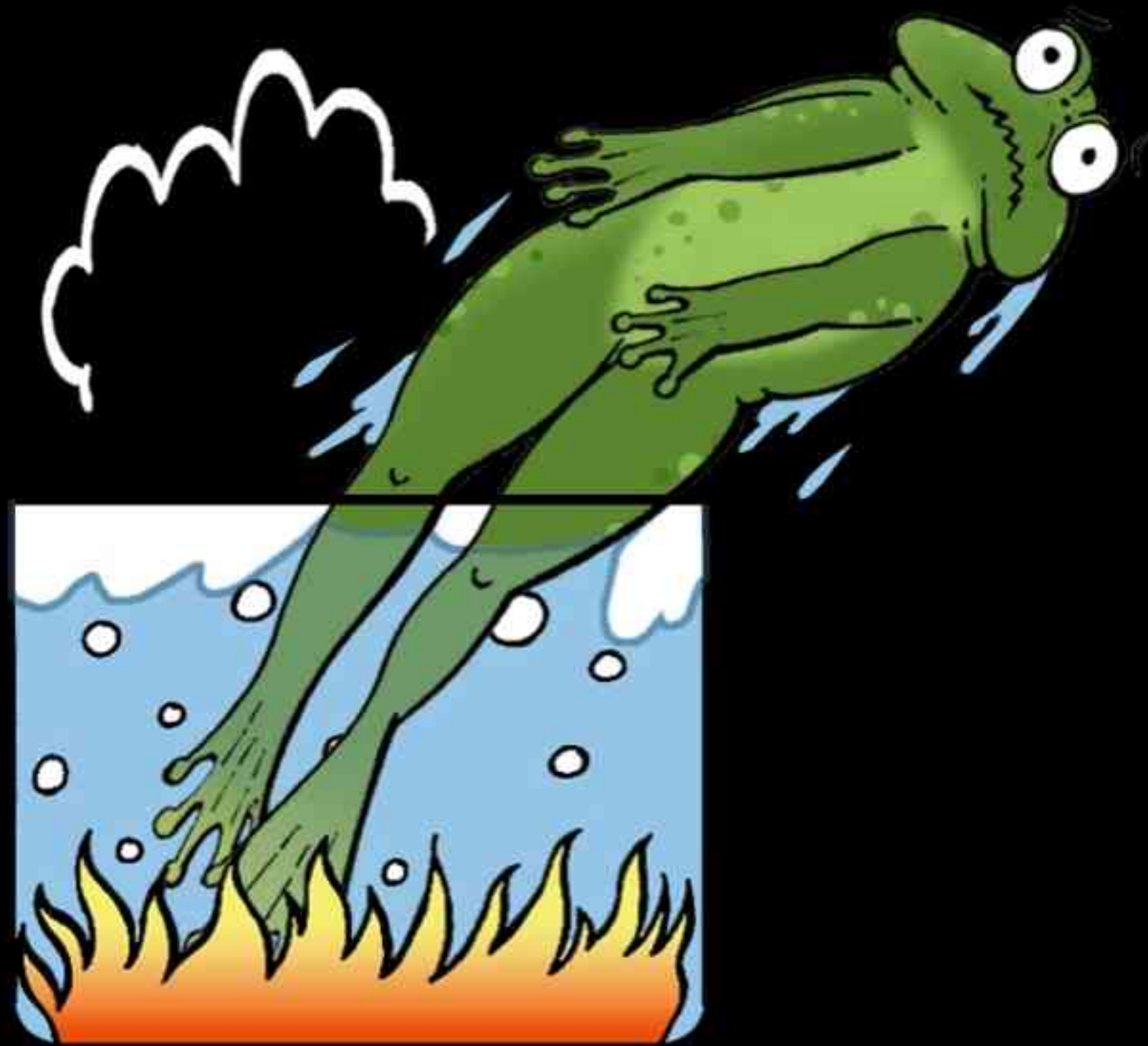






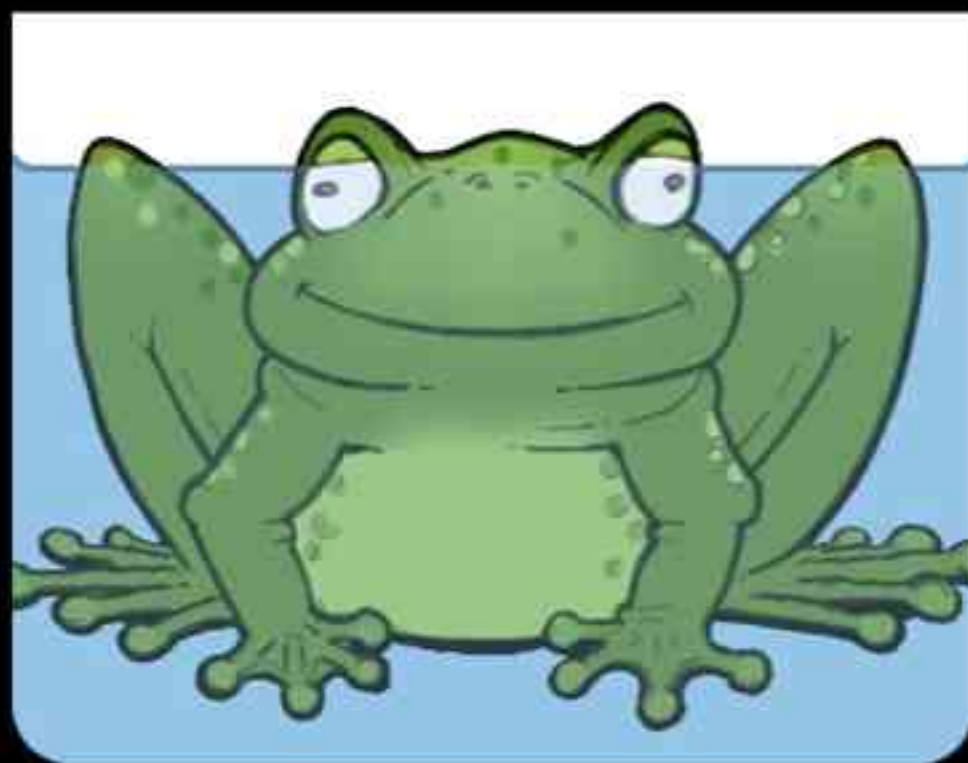
















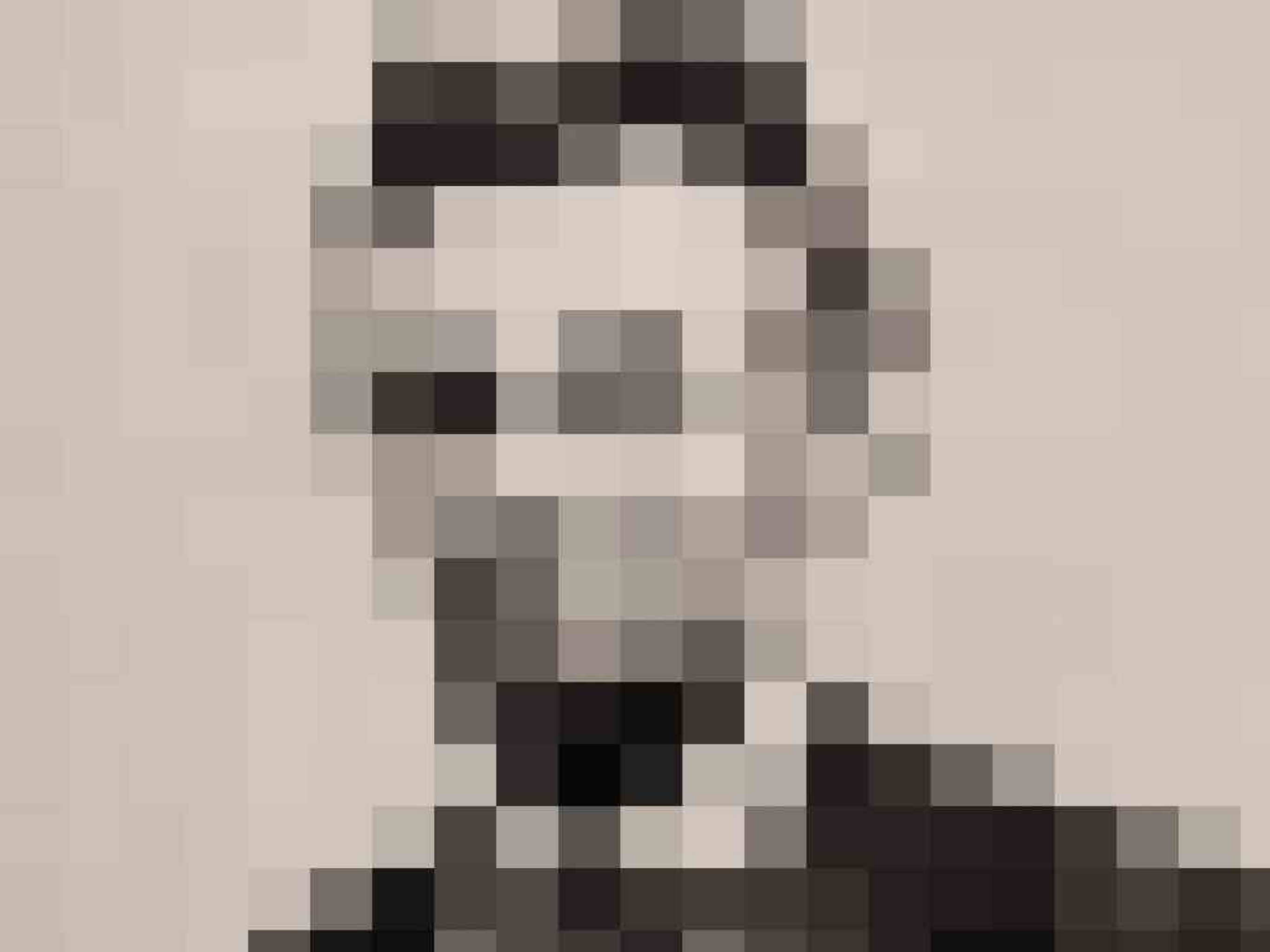












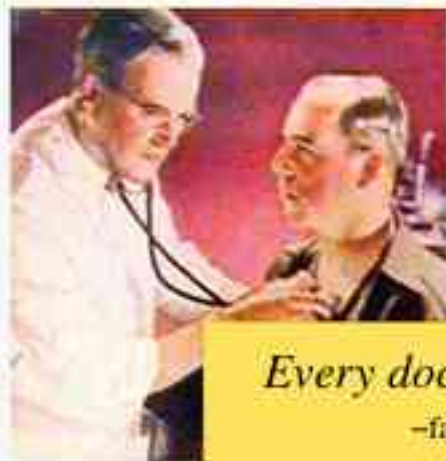












*Every doctor in private practice was asked:*

*-family physicians, surgeons, specialists...  
doctors in every branch of medicine-*

*"What cigarette do you smoke?"*



*According to a new Nationwide survey:*

# More Doctors Smoke Camels

*than any other cigarette!*

**not a guess, not just a trend . . . but an actual fact based on  
the statements of doctors themselves to 3 nationally  
known independent research organizations.**

THE  
"T-ZONE" TEST  
WILL  
TELL YOU



The "T-Zone" - T for taste and T for throat - is your own laboratory, your proving ground, for any cigarette. For only your taste and your throat can decide which cigarette tastes best to you... and how it affects your throat. On the basis of the experience of many, many millions of smokers, we believe Camels will suit your "T-Zone" to a "T."



R. J. REYNOLDS TOBACCO CO.

**Y**es, your doctor was asked . . . along with thousands and thousands of other doctors from Maine to California.

And they've named their choice - the brand that more doctors named as their smoke is *Camel*! Three nationally known independent research organizations found this to be a fact.

Nothing unusual about it. Doctors smoke for pleasure just like the rest of us. They appreciate, just like you, a mildness that's cool and easy on the throat. They too enjoy the full, rich flavor of expertly blended costlier tobaccos. Next time, try Camels.

# PROPOSAL FOR THE ORGANIZATION OF THE WHITECOAT PROJECT

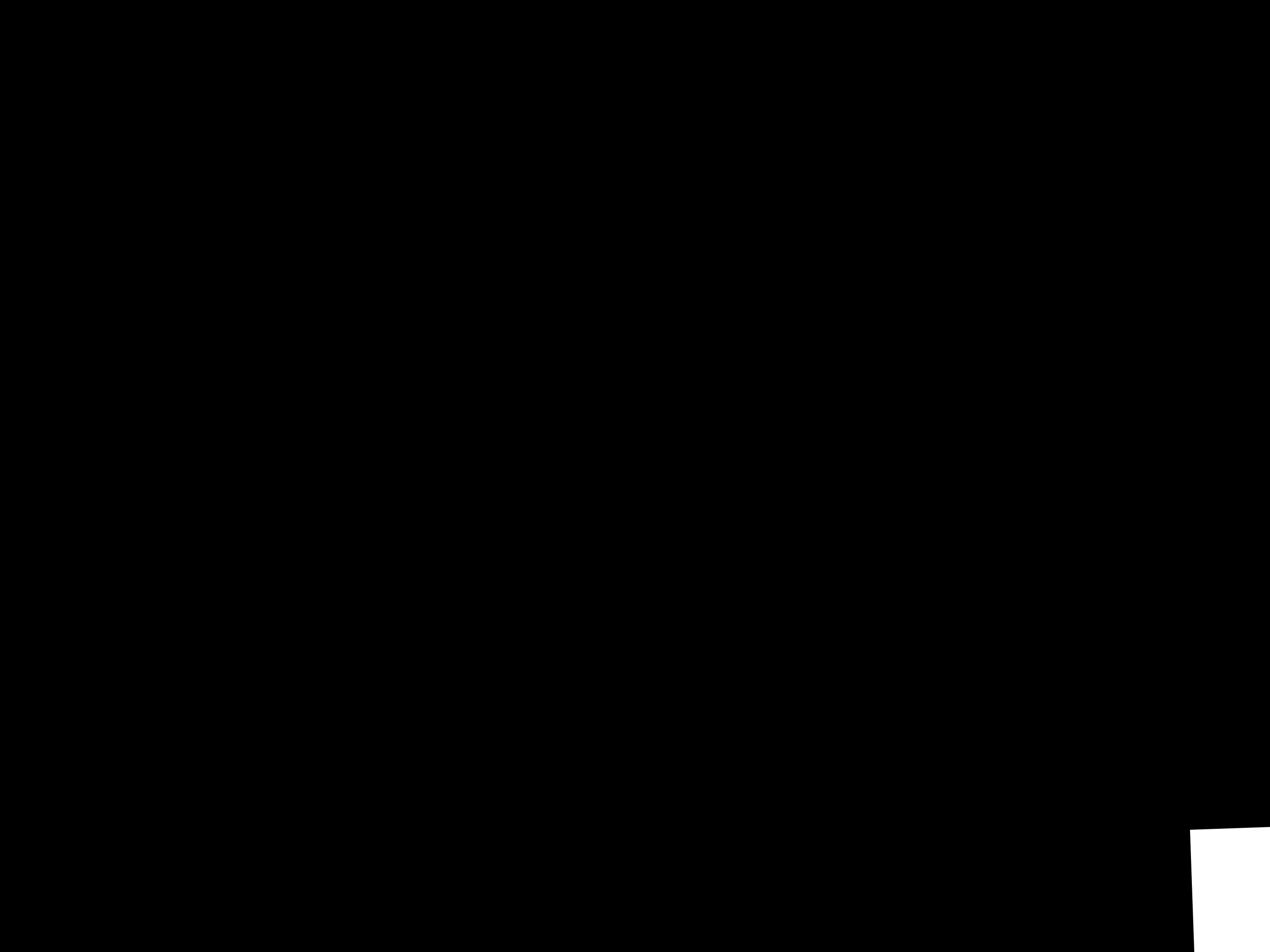
## SUMMARY OF THE WHITECOAT PROJECT

The Project is designed to support market-level ETS programmes with the PM EEMA and EEC Markets. The Objectives of these overall ETS programmes are defined as:--

End Goals:           -- Resist and roll back smoking  
                          restrictions  
                          -- Restore smoker confidence

Pre-                   -- Reverse scientific and popular  
requisites:           misconception that  
                          ETS is harmful  
                          -- Restore social acceptability of  
                          smoking





# **Republican Pollster Frank Luntz:**

**“The environment is probably the single issue on which Republicans in general, and President Bush in particular, are most vulnerable...**

**“You need to continue to make the lack of scientific certainty a primary issue by becoming even more active in recruiting experts sympathetic to your view.”**



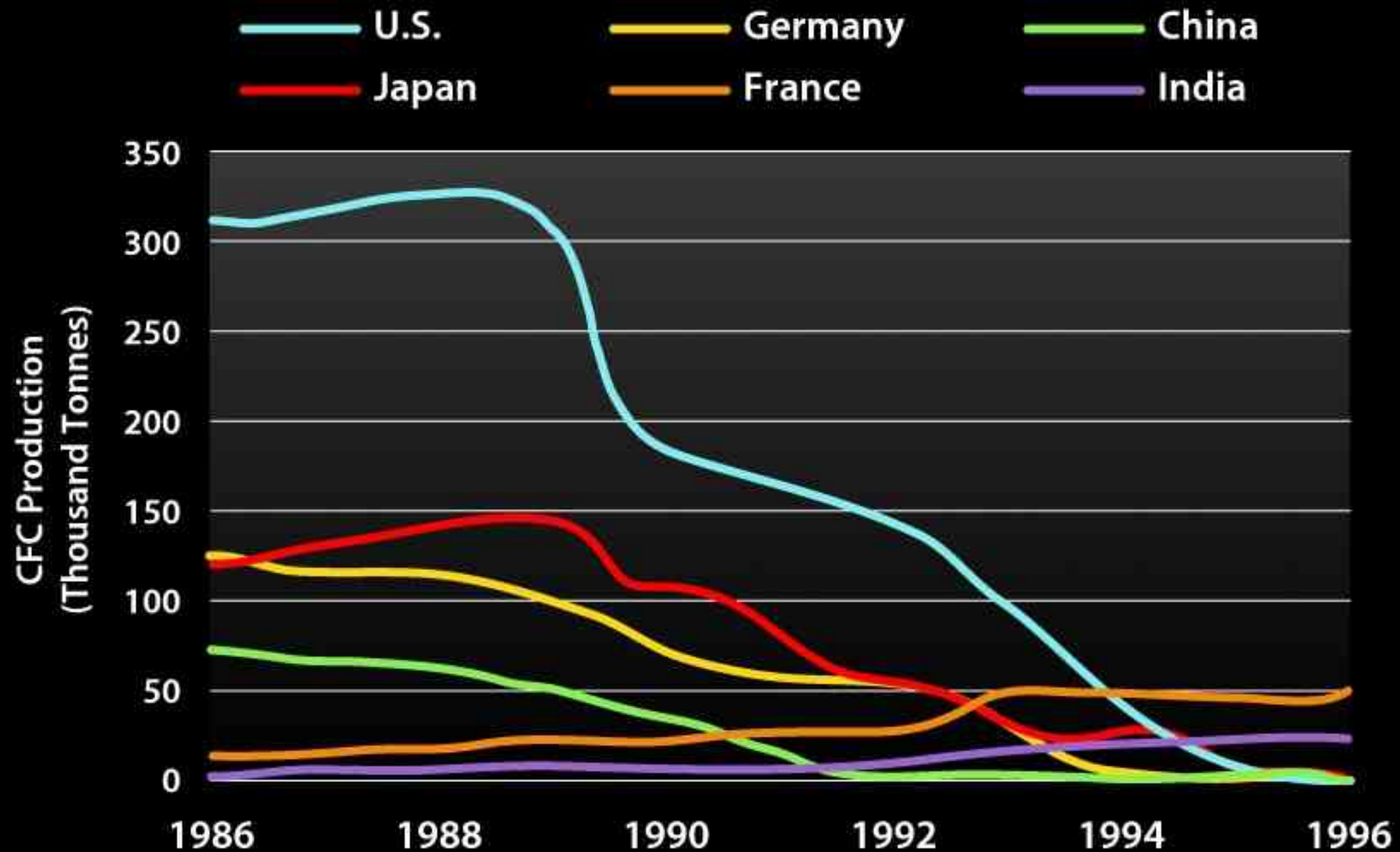
# The Future







# The CFC Success Story

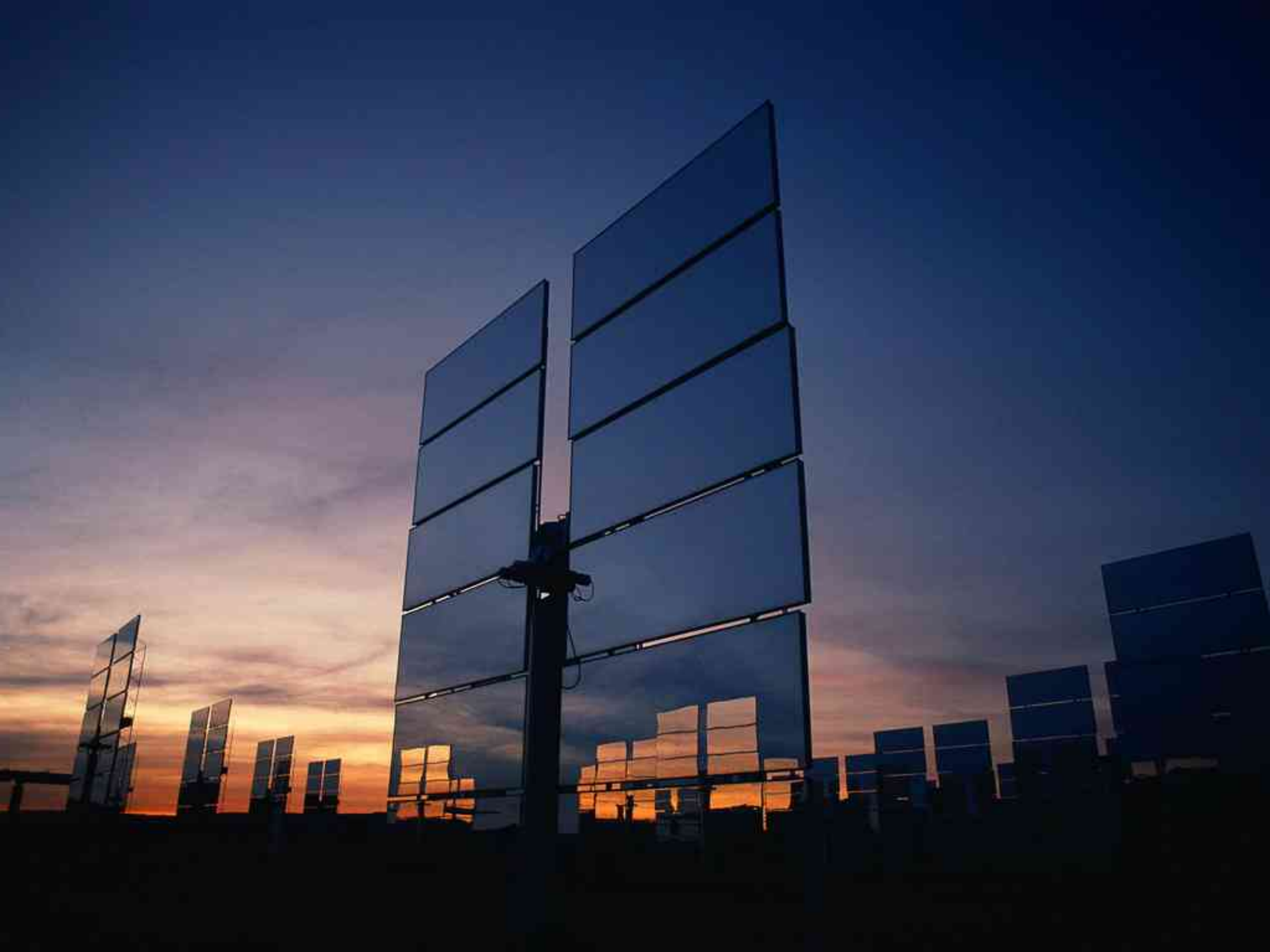


Production of Chlorofluorocarbons in Selected Countries, 1986-1997



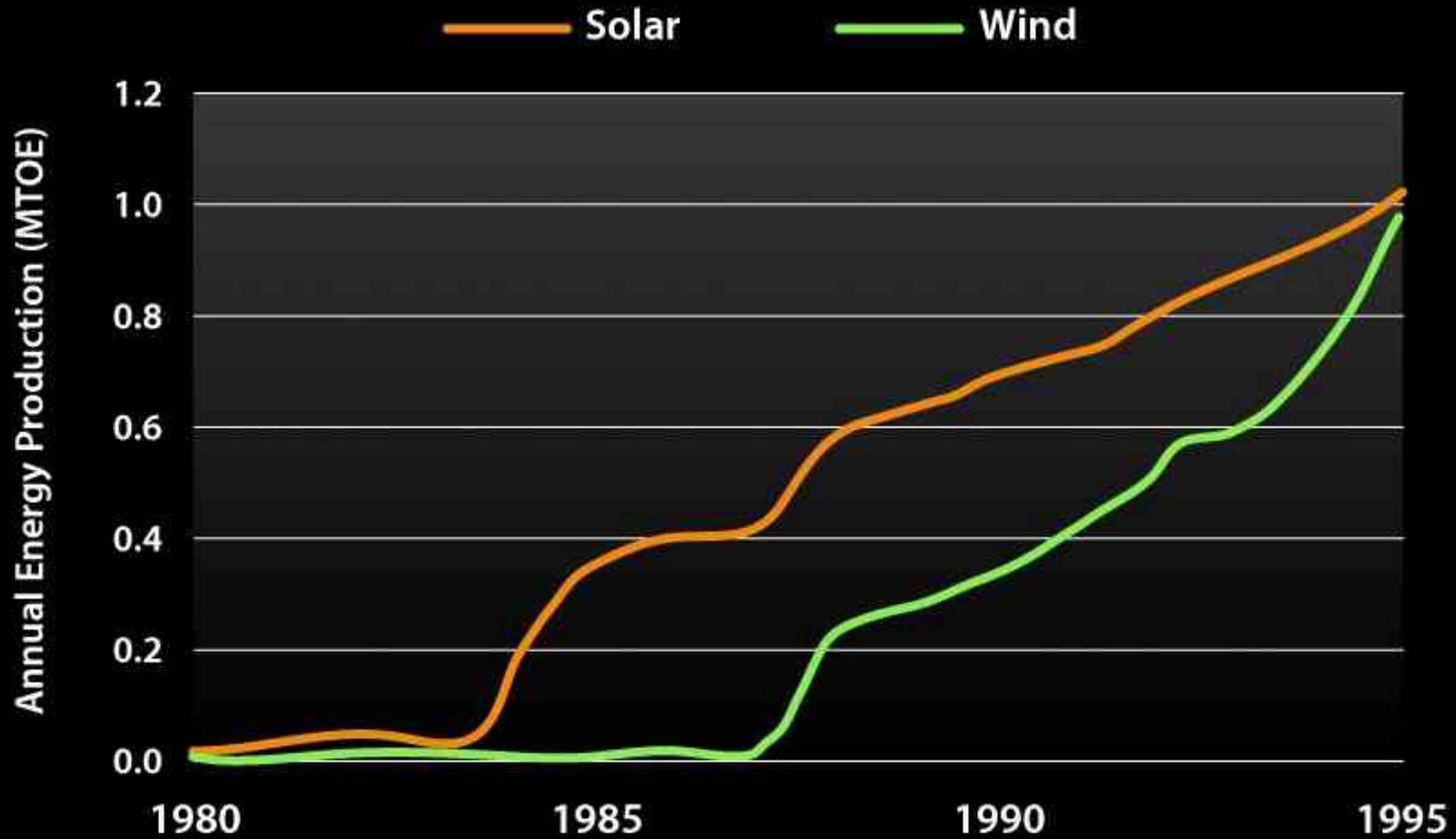




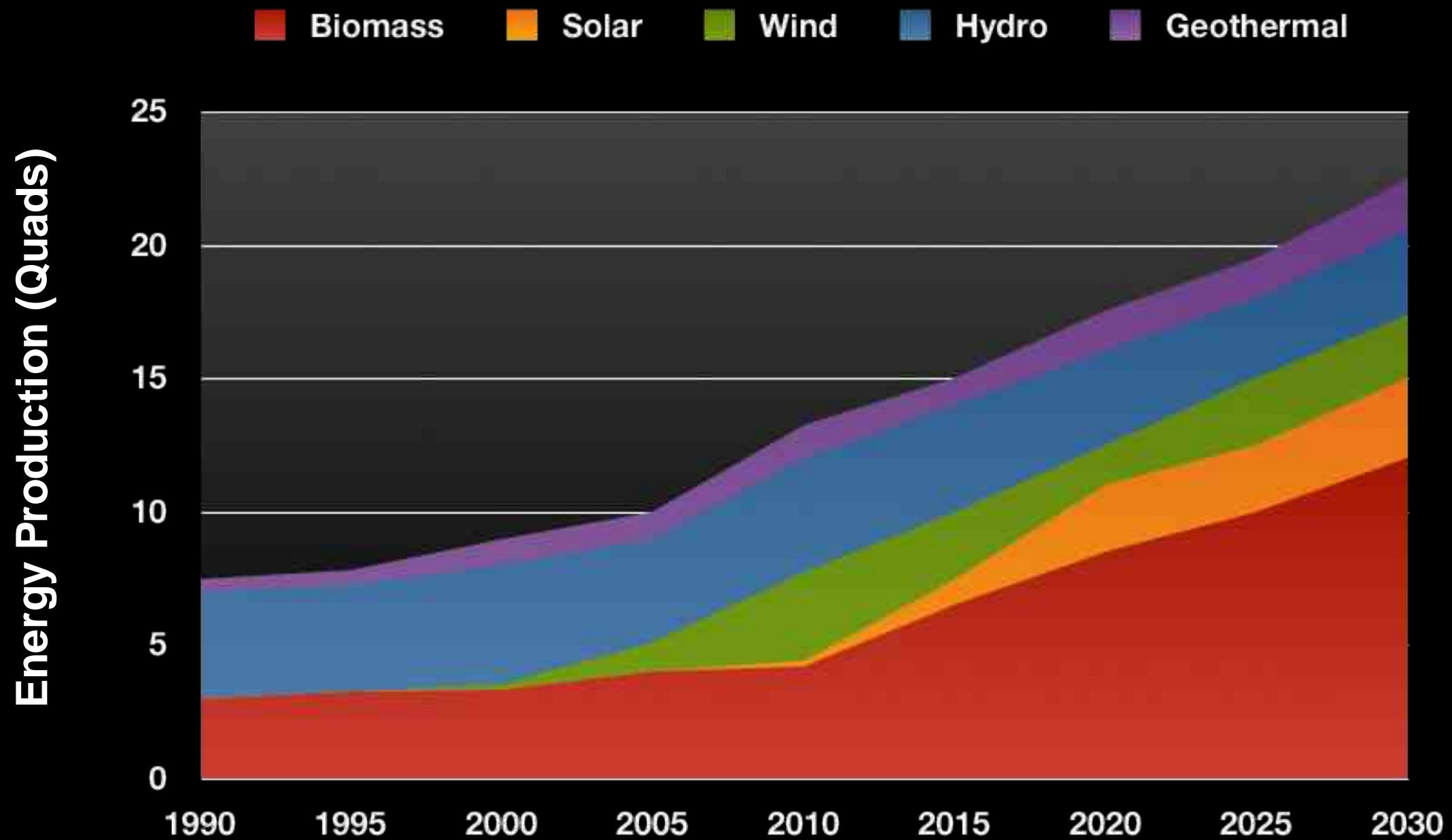




# Global Solar and Wind Energy Production

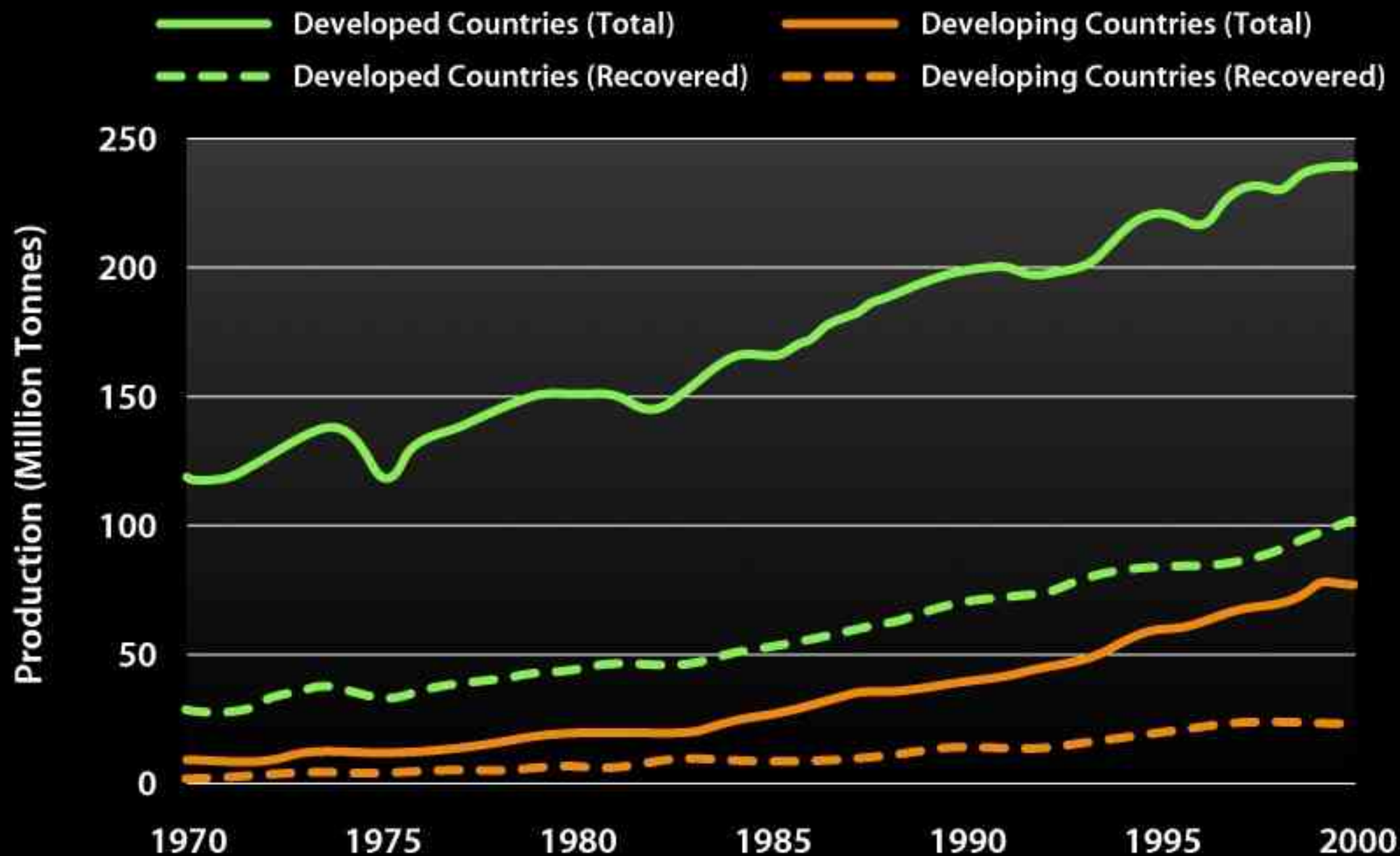


# U.S. Renewable Energy Future





# Total Paper Production and Recovered Paper Products

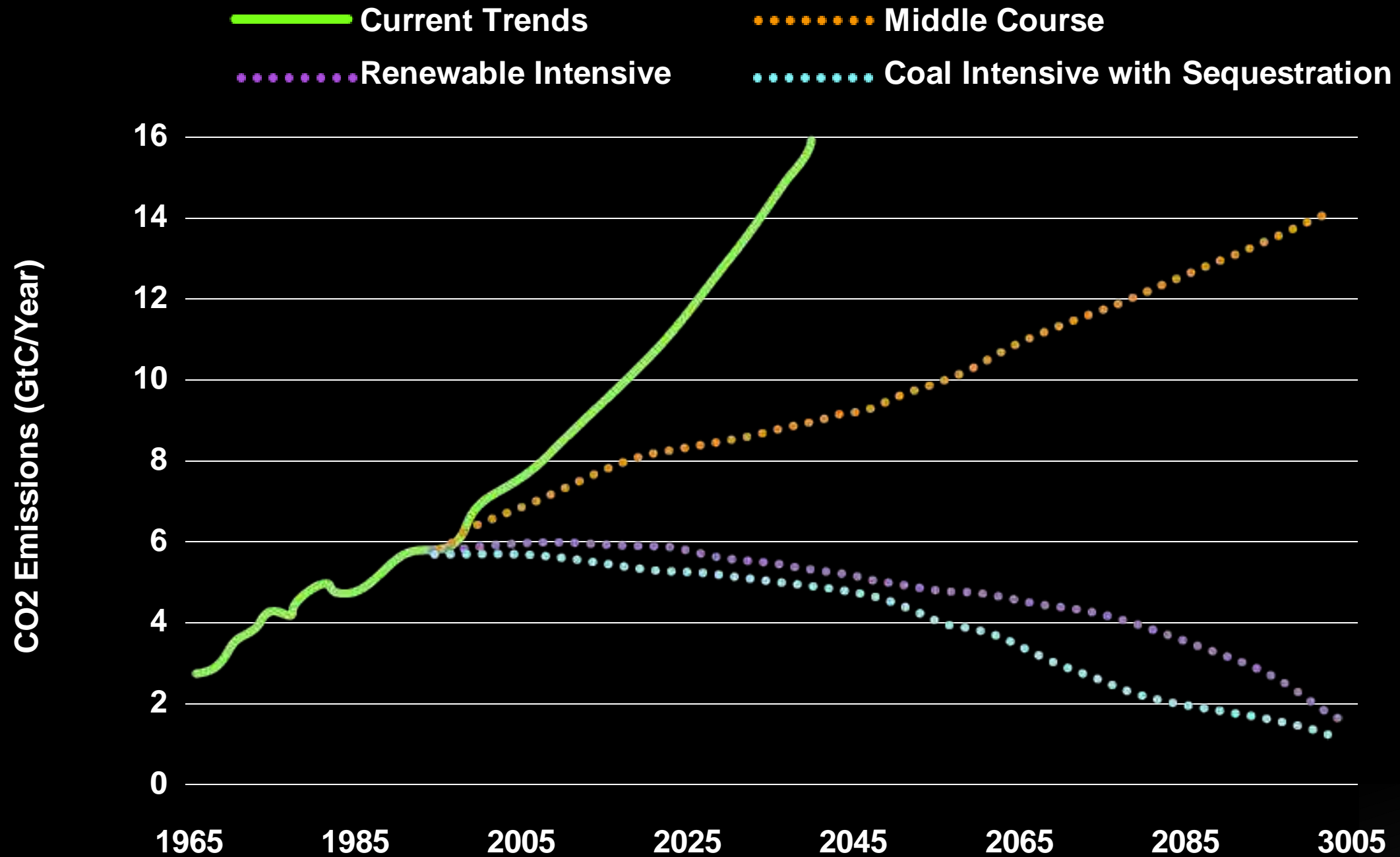


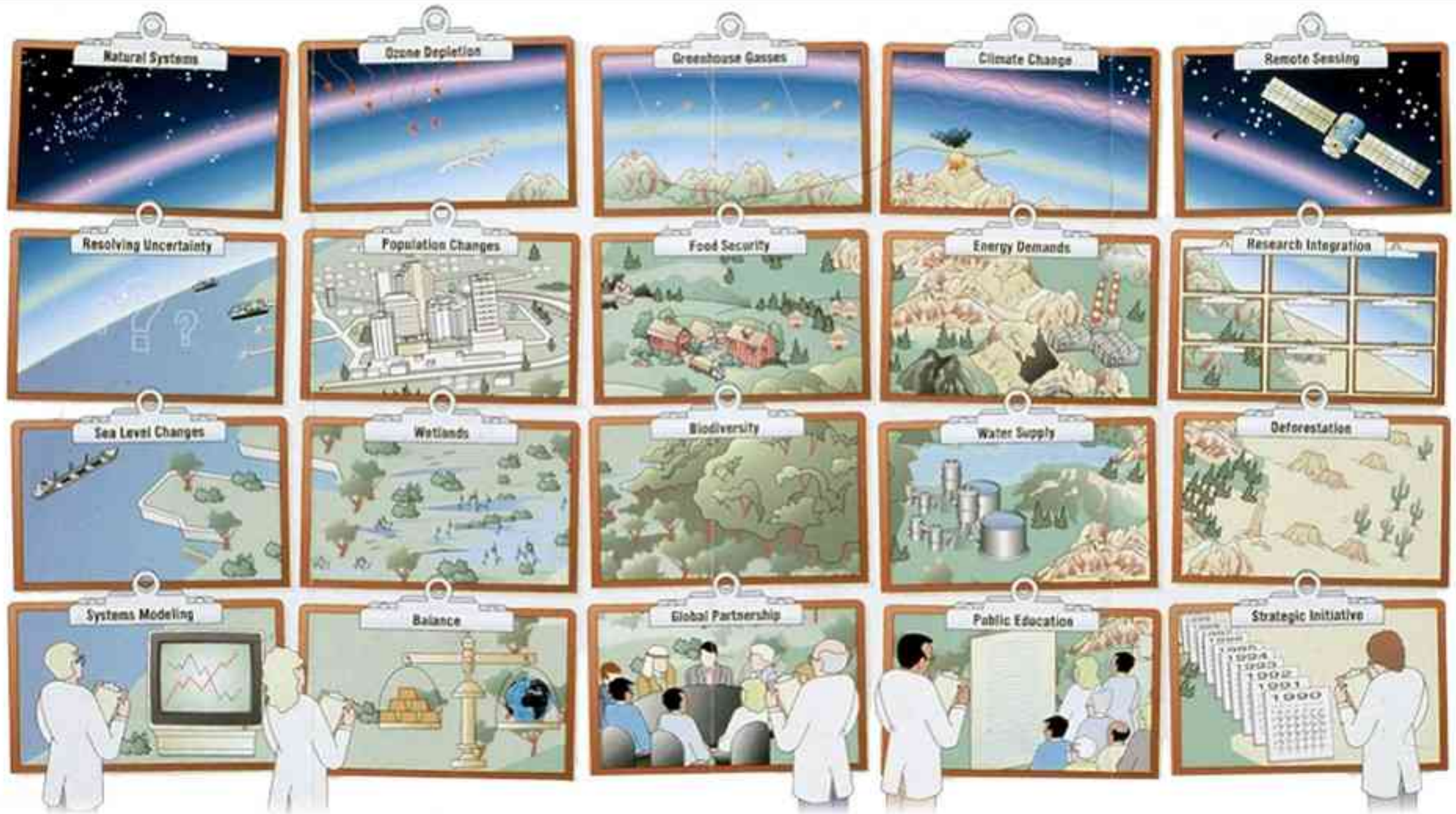
# Examples of Efficiency Gains in Selected Industries

Industry	Years	Efficiency Gain Per Unit Output
European Union Chemical Industry	1985 to 1996	34% Less Energy
United States Chemical Industry	1974 to 1998	43% Less Energy
European Paper Industry	1975 to 1997	50-80% Less Water
European and Canadian Paper Industry	1990 to 1998	10.5% Less Energy
Steel Industry in 10 OECD Countries	1971 to 1991	20% Less Energy



# Some energy pathways can reduce risks, but this will be a challenge







# Balance

