

# THE GREENHOUSE EFFECT

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Science Honor Society



Center Moriches High School

Center Moriches NY

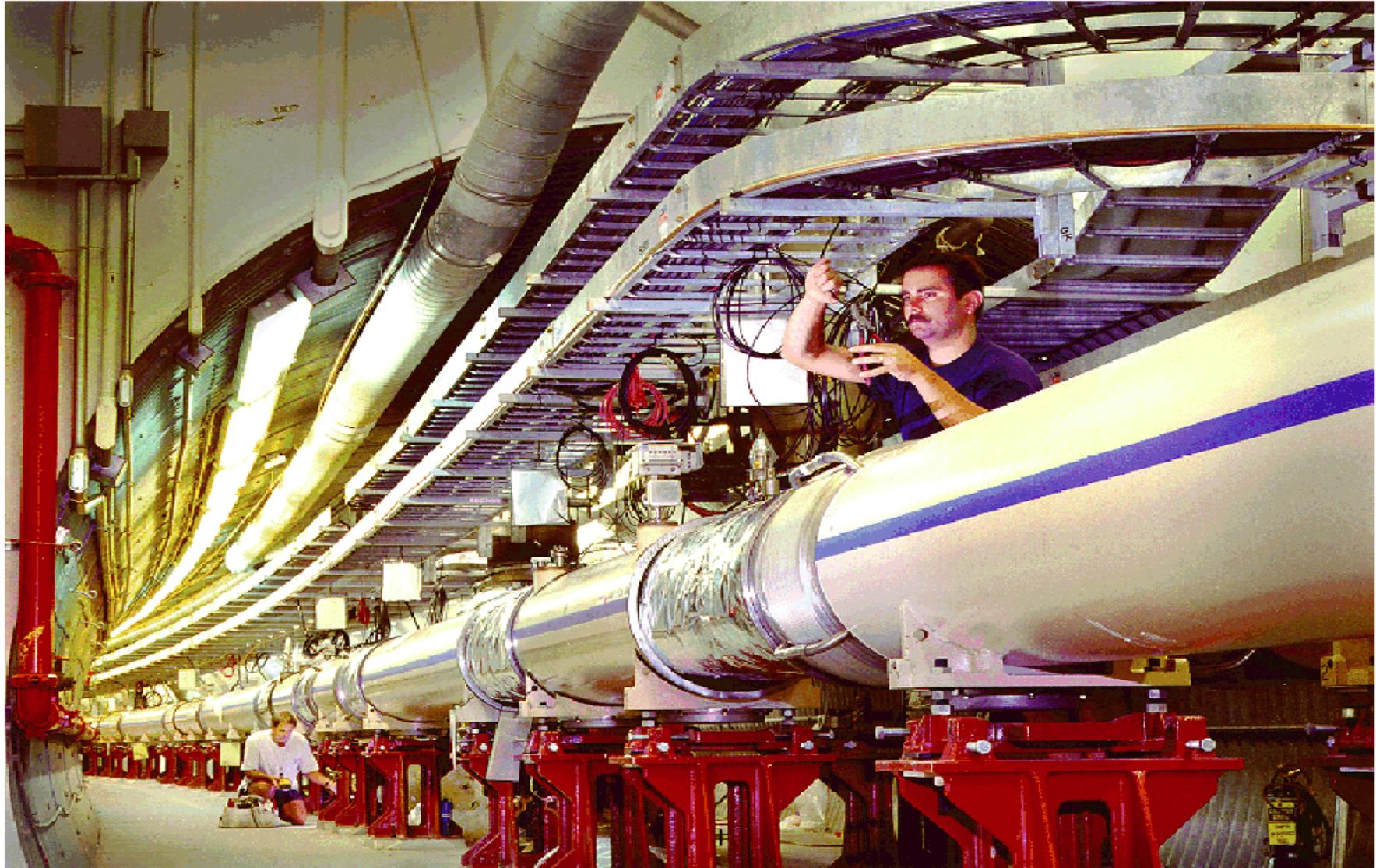
February 3, 2005

<http://www.ecd.bnl.gov/steve/schwartz.html>

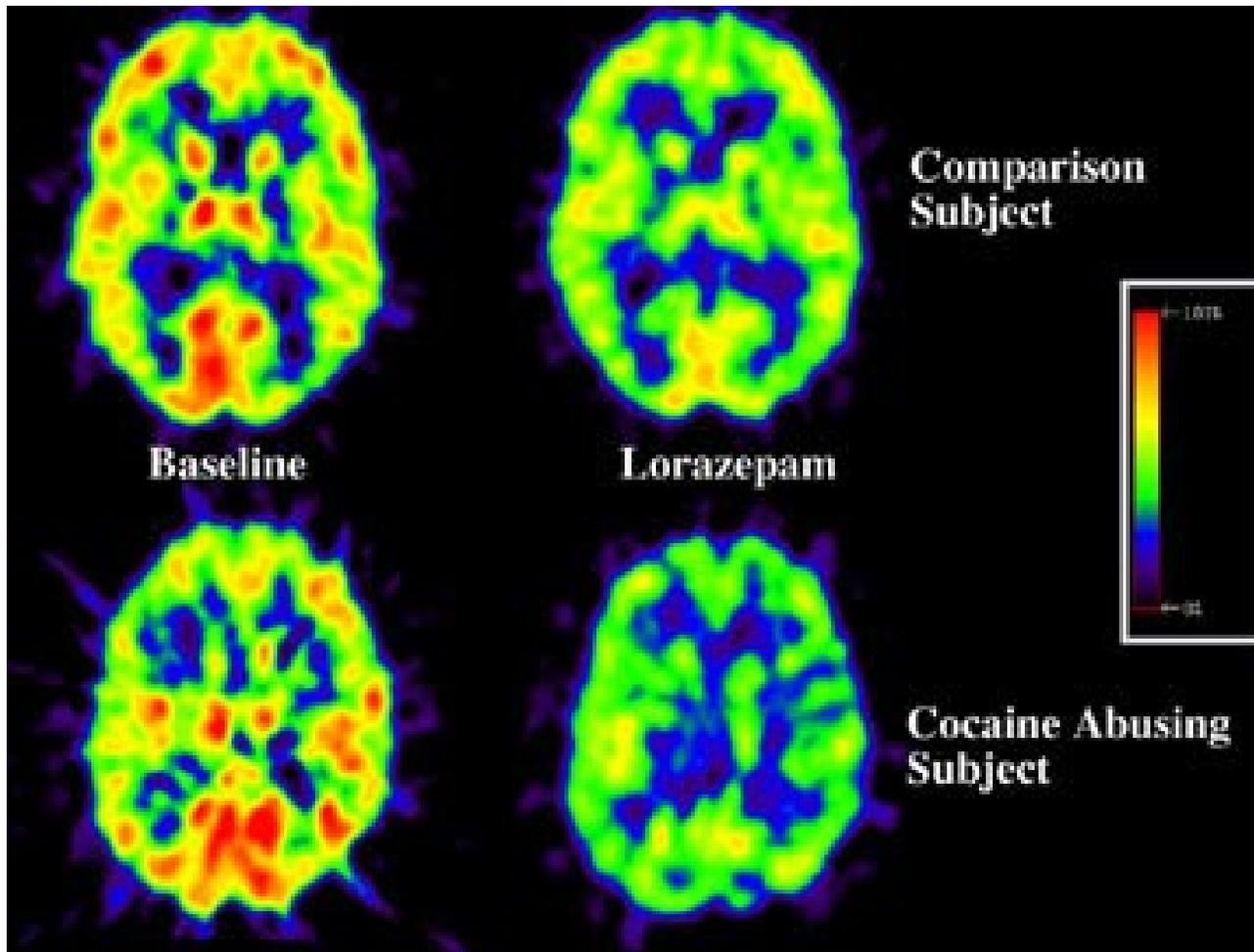
# BROOKHAVEN NATIONAL LABORATORY



# RELATIVISTIC HEAVY ION COLLIDER (RHIC)

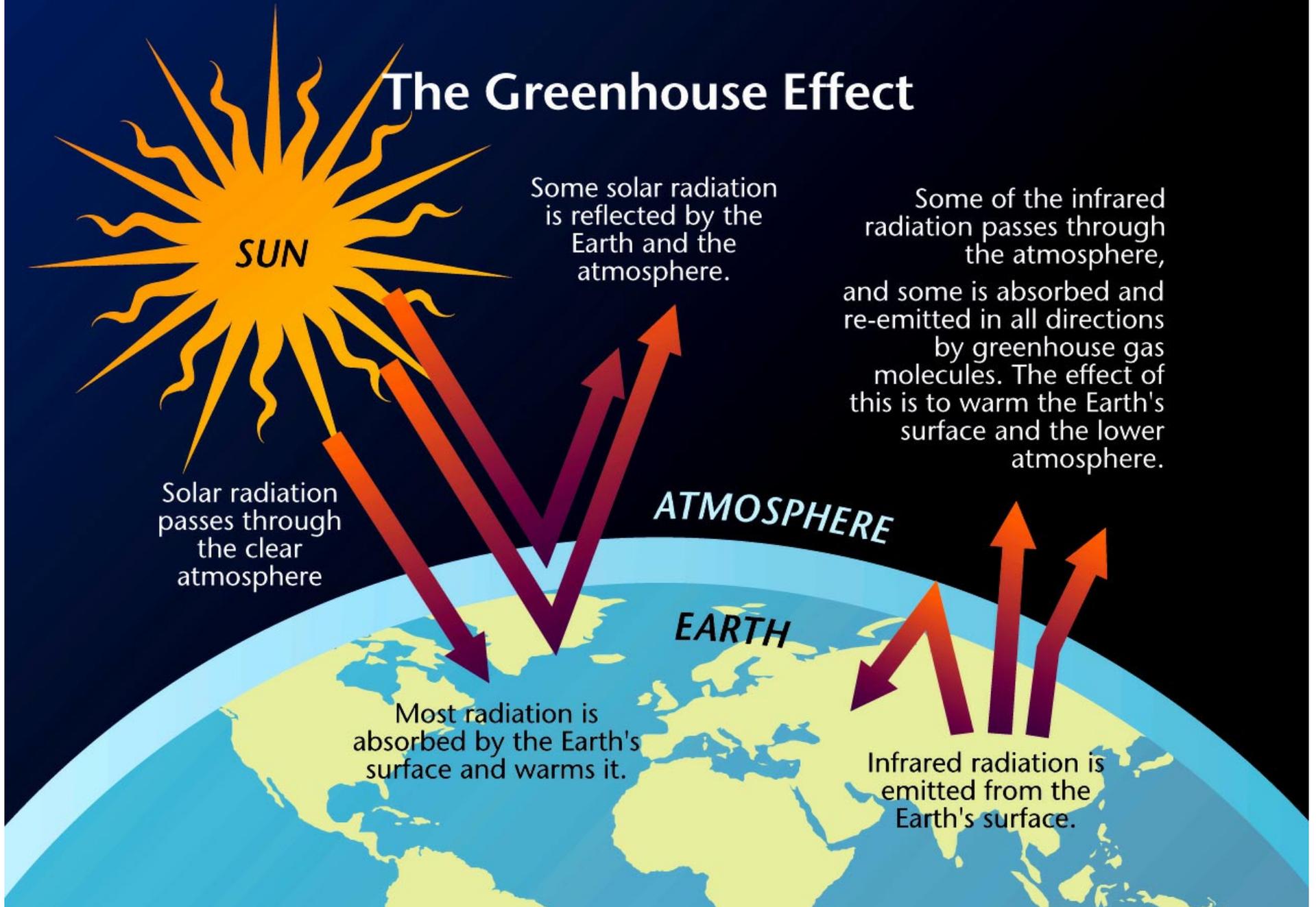


# IMAGING STUDIES OF BRAIN FUNCTION

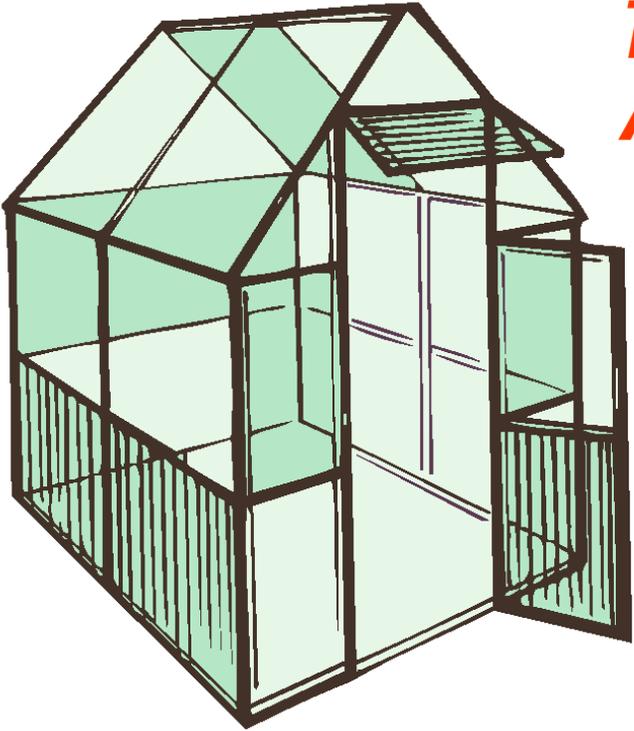


*This image comes from a study that compared the brains of normal human subjects and cocaine abusers, in an effort to learn more about how this drug affects brain chemistry.*

# The Greenhouse Effect



# THE GREENHOUSE EFFECT



## *THE EARTH'S ENERGY BUDGET: A DELICATE BALANCE*

- Sunlight heats the Earth.
- The warm Earth radiates energy (in the form of infrared radiation, or heat) back out to space.
- Some of this infrared radiation is trapped in the atmosphere, giving Earth its temperate climate.

This is the **greenhouse effect**.  
Without it, the Earth's climate would be like the moon's, harsh and severe.

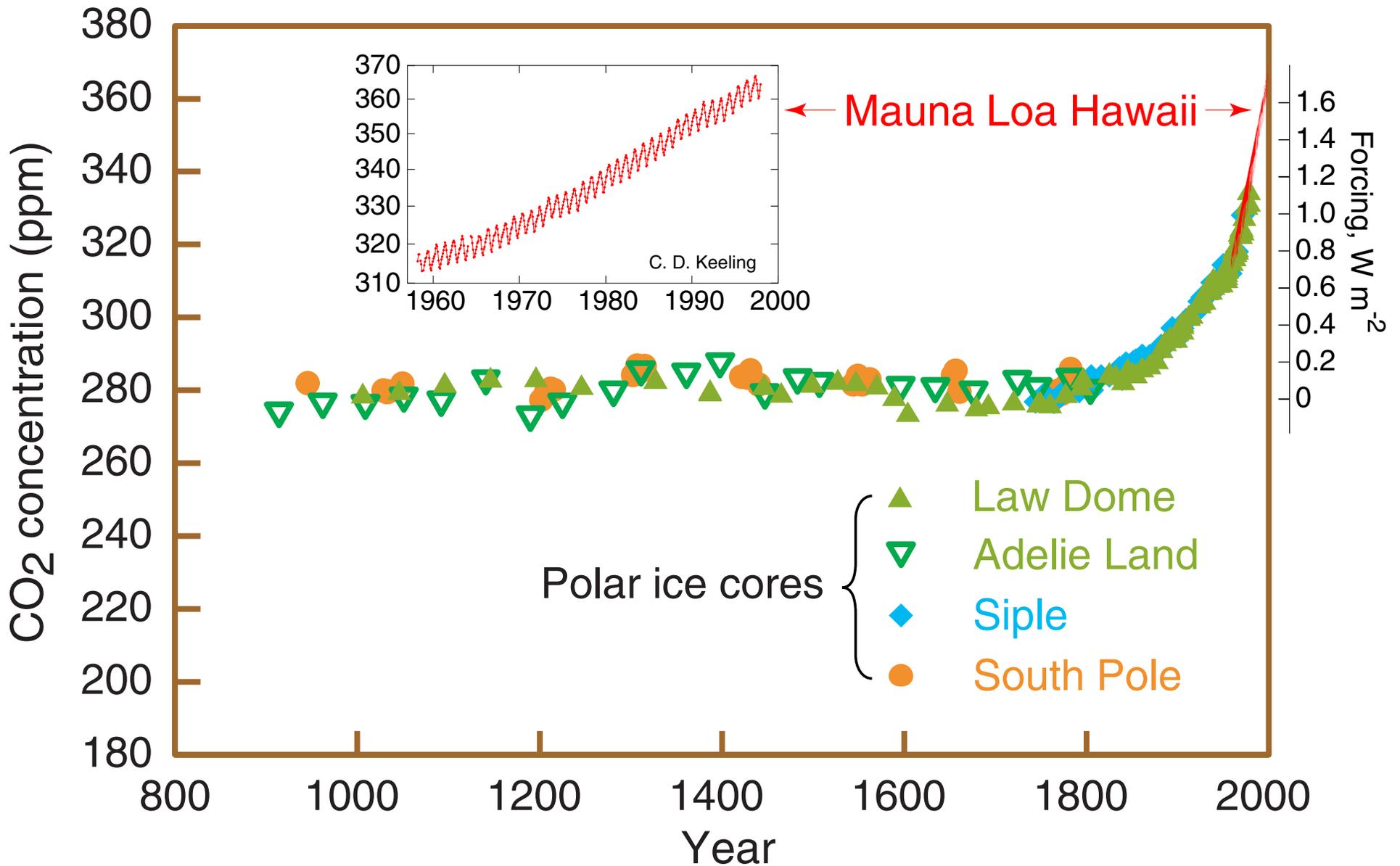
*Everybody talks about the weather —*

*But nobody does anything about it.*

*– Mark Twain*

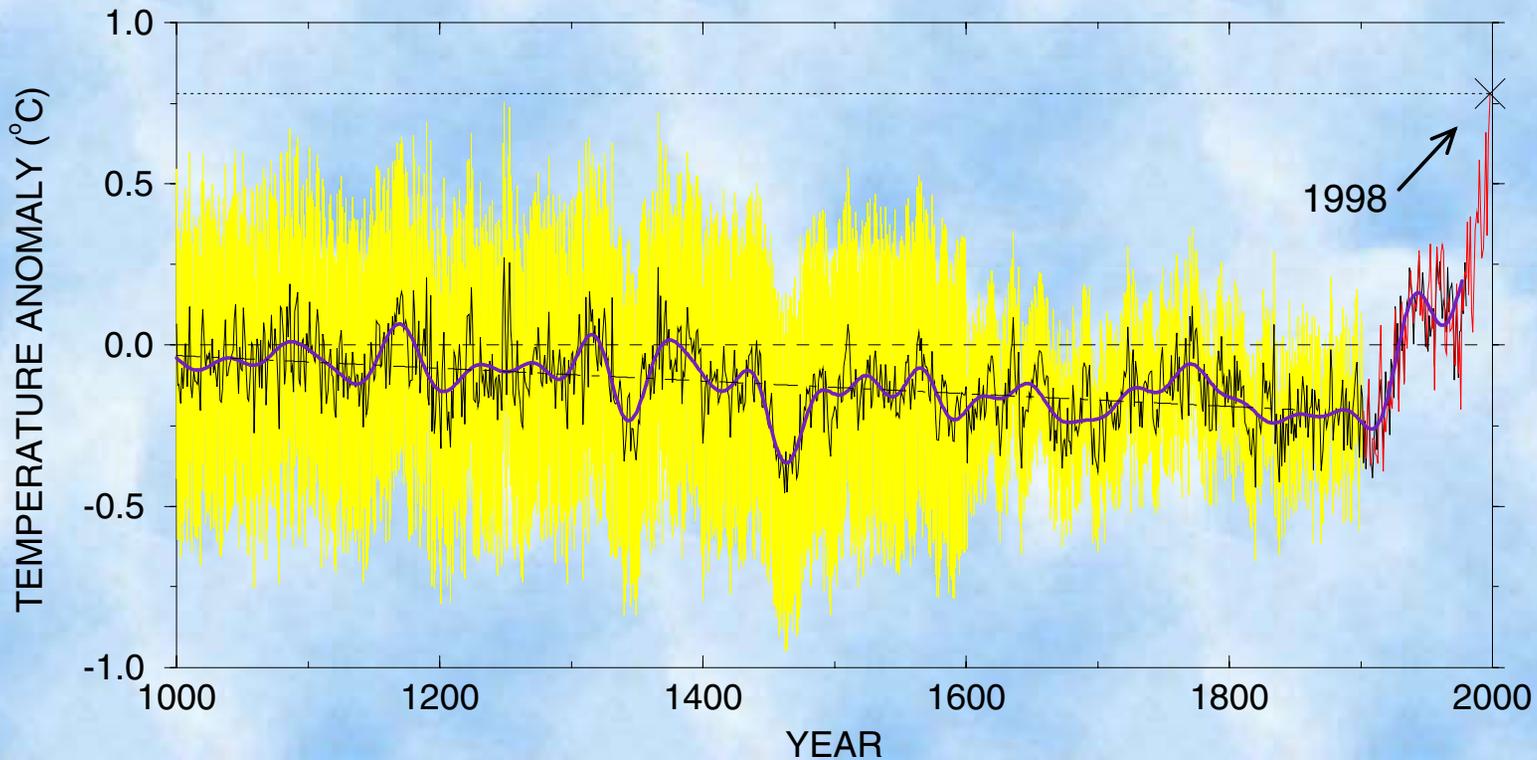
*Now with the greenhouse effect,  
we ARE doing something about it.  
What are we doing?*

# ATMOSPHERIC CARBON DIOXIDE IS INCREASING



Global carbon dioxide concentration and infrared radiative forcing over the last thousand years

# THE TEMPERATURE'S RISING



- Reconstruction (AD 1000-1980)
- Instrumental data (AD 1902-1998)
- - - Calibration period (AD 1902-1980) mean
- Reconstruction (40 year smoothed)
- - - Linear trend (AD 1000-1850)

Northern Hemisphere temperature trend (1000-1998), from tree-ring, coral, and ice-core proxy records As calibrated by instrumental measurements. *Mann et al., Geophysical Research Letters, 1999*



# HOW MUCH CARBON IS IN A GALLON OF GASOLINE?



1 lb?



2 lbs?



3 lbs!?

5 lbs!?!?

All of this carbon goes into the atmosphere as carbon dioxide when you burn the gasoline in your car.



THE MOST EFFECTIVE WAY TO  
DOUBLE THE FUEL ECONOMY  
OF A CAR . . .

***IS TO PUT TWO  
PEOPLE IN IT!***



***WHERE IS THIS CARBON DIOXIDE COMING FROM?  
WE ARE ALL RESPONSIBLE.***



Burning a gallon of gasoline in your car puts 5 pounds of carbon in the atmosphere as carbon dioxide (CO<sub>2</sub>), and it will stay there for decades — maybe a century!

Other sources are home heating and electric power production.



# Global Atmosphere, Global Warming

## QUESTIONS ABOUT GLOBAL WARMING

- IS IT REAL?
- IS IT IMPORTANT?
- WHAT IS IT DUE TO?
- HOW MUCH MORE CAN WE EXPECT?
- ARE WE SEEING JUST THE TIP OF THE ICEBERG?



***RESEARCH AT BROOKHAVEN  
NATIONAL LABORATORY IS HELPING  
TO ANSWER THESE QUESTIONS.***

# Brookhaven National Laboratory

Summer Sunday Tours

